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DISEASES OF THE PHARYNX AND  
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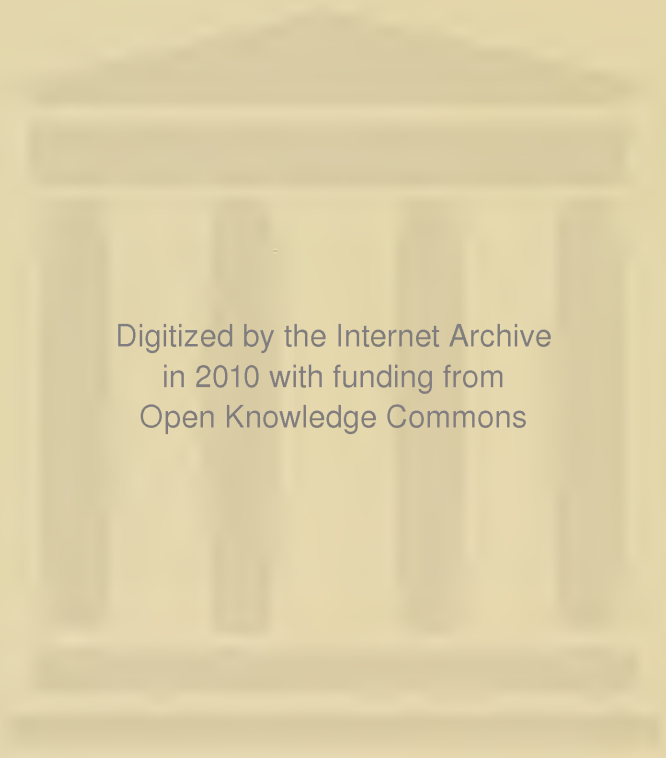


## TRANSLATOR'S PREFACE

IT is not necessary to say anything by way of introduction of Dr. E. J. Moure to the medical profession of this country. He is well known by his writings in the field of medicine he has made his own. His work, however, on ' Diseases of the Pharynx and Larynx ' is not so familiar to British readers as it is on the Continent ; hence the appearance of the present translation. It has been the endeavour of the translator in making the abridgment to omit no essentials, and to follow the author's language as closely as possible, and he has refrained from any alteration of the author's style and from any comment on his opinions. He trusts the volume may be of use as a small manual to young practitioners and senior students.

EDINBURGH, 1909.





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## AUTHOR'S PREFACE

IN presenting to the medical profession this work on the 'Diseases of the Pharynx and Larynx,' which constitutes in a way a second edition of my lectures on these diseases (1890), and to which I have added the pathology of the tonsils, the soft palate, the pharynx, and the lingual tonsil, I have endeavoured, above all, to write a book complete enough to furnish the general practitioner with useful information regarding these affections, with respect to which he is not always conversant.

Thanks to our methods of investigation, as well as to the introduction of bacteriology into the clinical study of throat diseases, we are now in a better position to understand the pathology of the pharynx. The subject of therapeutics has also been advanced by the recent progress of special surgery. I have, moreover, deemed it expedient to adopt a classification a little different to that adopted by the majority of authors.

Among the inflammatory conditions I have included a certain number of diseased conditions little known, or at least little studied, till recent years, and which have not found a place in the most recent treatises and classical manuals. Such conditions are: erythematous angina, erythema polymorphia, pemphigus, and acute ulcerative lacunar tonsillitis, which I have differentiated from ulcerative membranous tonsillitis, with which it is so often confused.

As regards tonsillar abscesses, I have adopted a classification based upon the origin of these suppurative processes,

and, above *all*, upon the history of their duration. From these clinical and anatomical observations a special plan of treatment has been evolved, to which I have referred in passing. After the anginous affections proper have been discussed, I have passed on to the acute and chronic affections of the lingual tonsil, together with the tumours of that region; furthermore, I have described in a special chapter simple degenerations of that gland, and especially lingual goitre and cysts of Bochdalek's canal.

On the other hand, I have not thought it necessary to burden this book with a description of the anginæ symptomatic of rheumatism, scarlet fever, German measles, roseola, measles, influenza, erysipelas, small-pox, chicken-pox, and mumps.

These affections, it seems to me, are best treated in books on general medicine, where symptomatic conditions find a better place than in a special work. In fact, the conditions which accompany these symptomatic affections of the throat are in themselves sufficient to make a diagnosis, and as regards their treatment there is nothing special to note.

Scarlatinal angina, perhaps, alone merits a special description, and here I am obliged to point out the differential diagnosis between simple infectious anginæ and those due to the lesions of scarlet fever in the pharynx.

In the second part, which is devoted to the diseases of the larynx, I have described the methods which we make use of in modern examination. In this part I have described Kirstein's direct method of tracheoscopy and Killian's tracheo-bronchoscopy. In the chapters devoted to the pathology of the larynx, I have included the study of influenzal laryngitis, spasmodic laryngitis, and rheumatic laryngitis. Likewise I have attempted to describe, not only the special operations *per vias naturales*, but also a large



number of the operations which have to be performed from without. I have attempted, as far as possible, to describe the rarer and more classical diseases of the pharynx and of the larynx, along with the instruments most commonly used in their treatment.

Thanks to my most excellent publisher, M. Octave Doin, I have been permitted to insert coloured plates, by means of which I am better able to demonstrate different points in the special pathology, often so difficult correctly to describe.

On the other hand, I have not thought it necessary to devote a special chapter either to intubation, which is very well described in special works, or to perichondritic affections, as I do not consider the latter to exist as primary and truly idiopathic lesions. Cartilaginous lesions are nearly always secondary. I have described the perichondritic affections along with each of the diseases, in the course of which it is almost always the rule to meet with alterations in the frame-work of the larynx.

Finally, in this work, I have tried above all to show the result of my practice during the last twenty-five years. If my views appear at times contrary to those generally laid down in classical works, I have the conscious feeling that they are the result of my clinical observations. The same may be said of the therapeutics. Nearly everything I have described is the outcome of my own experience rather than the theoretical deduction from this or that special pathology.

E. J. MOURE.

BORDEAUX.



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# ELEMENTARY AND PRACTICAL TREATISE ON DISEASES OF THE PHARYNX AND LARYNX

## PART I

### ANATOMY AND PATHOLOGY OF THE PHARYNGEAL CAVITY

#### CHAPTER I

##### THE ANATOMY OF THE PHARYNGEAL CAVITY

FROM an anatomical point of view we may consider the pharynx as belonging to the buccal cavity and to the entrance to the digestive tract. It is bounded in front by the soft palate with its annexa, and by the tonsils. The pharynx proper forms the posterior wall attached to the vertebral column, while superiorly it is limited by an imaginary plane passing backwards through the base of the uvula. The inferior boundary extends in front from the base of the tongue, while behind and on a deeper plane it is formed by the epiglottis, the aryepiglottic folds, the arytenoid region, and the œsophageal opening. Posteriorly the wall of the pharynx is in contact with the vertebral column.

#### Soft Palate, with its Pillars.

The soft palate is a musculo-membranous septum stretching backwards, without any well-marked line of demarcation, from the osseous palate. Being essentially mobile and contractile, this structure, at first horizontal, afterwards bends

backwards, becoming almost vertical, and forming a regular curve. It has two surfaces and four borders.

The antero-inferior or buccal surface is concave, smooth, and of a pink colour, like that of the whole buccal cavity. The posterior or nasal surface is, on the contrary, convex, paler in colour, and rough. The anterior border is continuous with the posterior palatal arch; the lateral borders extend into the neighbouring regions. The inferior free border, which is rather thin, presents mesially a conical, elongated projection—the uvula—which varies in length from 10 to 15 millimetres. Four mucous folds spring from its base—two anterior and two posterior—which divide as they proceed. The first two form the anterior pillars of the soft palate, and end laterally at the base of the tongue, almost on a level with the anterior extremity of the lingual V.

The posterior pillars diverge backwards towards the lateral walls of the pharynx, and blend with them. These four pillars form along with the uvula two arches, whose internal border, limited by the uvula, does not descend so low as the others. Between the pillars and on the lateral walls are two fairly deep recesses, known as the **tonsillar fossæ**, in which the tonsils are lodged.

The soft palate is composed of a quadrilateral aponeurosis, which is attached by its anterior border behind the vault of the hard palate, and blending laterally with the tendon of the **tensor palati**, is carried backwards into the muscular fasciculus of the membranous palate.

The muscles of the soft palate consist of five pairs:

1. The **azygos uvulæ**, which is composed of a small cylindrical bundle of fibres, arises anteriorly from the palatine aponeurosis behind the posterior nasal spine, and is carried downwards and backwards to the top of the uvula, in which it ends. These two symmetrical muscles are continuous with each other, and were formerly regarded as a single median muscle.

2. The **levator palati** is attached to the inferior surface of the petrous portion of the temporal bone in front of the

carotid canal. Its fibres are carried downwards and inwards, and spread out in a fan-shaped manner over the posterior surface of the soft palate. This muscle on contraction raises the soft palate, and constricts the Eustachian orifice.

3. The **tensor palati** arises from the superior surface of the internal border of the base of the pterygoid apophysis on a portion of the great wing of the sphenoid, and on the antero-external walls of the Eustachian tube. The fibres are carried downwards, following the internal wing of the pterygoid apophysis, and bend over the hook of this bone, terminating by spreading out over the inferior surface of the soft palate. This muscle is principally concerned as a tensor of the soft palate and as a dilator of the tube.

4. The **palato-pharyngei** are situated in the substance of the posterior pillar, and follow exactly the same direction. One of the accessory fasciculi, however (the salpingo-pharyngeus), comes from the fibro-cartilaginous portion of the tube, whose orifice it dilates. This muscle serves also to raise the pharynx and larynx, and helps to narrow the faucial isthmus.

5. Finally, the **palato-glossi** are situated in the substance of the anterior pillar.

**Mucous Membrane.**—All the pharynx is covered with mucous membrane, which is a continuation of that lining the mouth. Like the latter, it is composed at its anterior part of stratified squamous epithelium. The posterior part, which, on the other hand, is a continuation of the nasal cavity, is lined at its superior part with cylindrical epithelium. It becomes gradually stratified, as it approaches the free or inferior border.

**Glands.**—The soft palate is very rich in glands, which are distributed over its two surfaces. It pre-eminently shows clusters of glands analogous to those of the cheeks and lips. They are connected by a submucous connective tissue, which is rather dense on its inferior but looser on its superior surface. It is most free at the level of the uvula, and it is on that account that this organ has such a marked tendency to swell.

**Vessels.**—The arteries of the soft palate are derived from—(1) the superior palatine, a branch of the internal maxillary—it follows the posterior palatine groove; (2) the inferior palatine, a branch of the facial; (3) the inferior pharyngeal, which is distributed mainly over the posterior pillars.

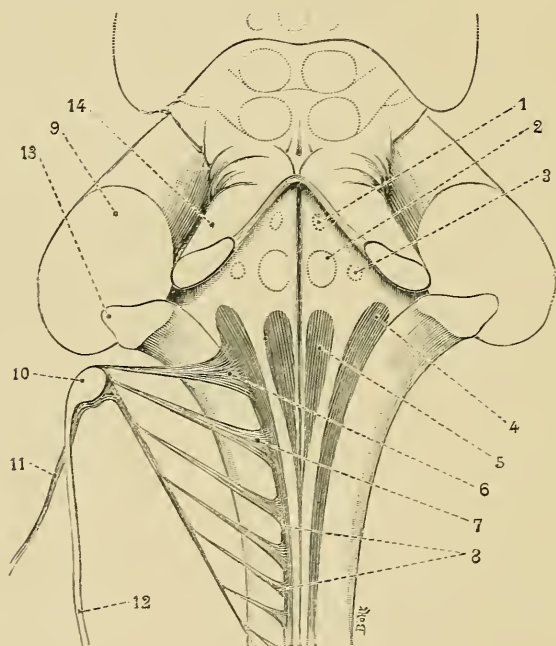


FIG. 1.

- 1, Motor nucleus of the trigeminal; 2, nucleus common to the facial and the oculo-motor; 3, facial nucleus; 4, nucleus of the glosso-pharyngeal; 5, nucleus of the hypoglossal; 6, origin of the pneumogastric; 7, bulbar origins of the spinal; 8, medullary roots of the spinal; 9, the middle peduncles of the cerebellum; 10, plexiform ganglion; 11, the external branch of the spinal supplying the trapezius and the sterno-mastoid; 12, the pneumogastric and the internal branch of the spinal; 13, inferior peduncles of the cerebellum; 14, superior peduncles of the cerebellum.

The superior veins anastomose with the inferior of the pituitary membrane, and with them open into the venous plexus of the zygomatic fossæ. The inferior veins, which are much more important, first appear in the lateral parts of the soft palate, where they unite with the tonsillar veins, or with

those at the base of the tongue. Like the latter, they flow into the internal jugular, or into one of its tributaries.

The lymphatics form a very important plexus, especially at the base of the soft palate, and this Sappey has compared to that on the dorsum of the tongue. These vessels flow into the deep glands of the neck.

**Motor Nerves.**—Up to the present it has been held, that the azygos uvulæ and the levator palati are innervated by the posterior palatine nerve, which, springing from the sphenopalatine ganglion, receives its motor branch from the Vidian nerve, and this in its turn receives its motor branch from the great superficial petrosal, a branch of the facial. The tensor palati may be innervated by a branch from the otic ganglion, which receives its motor branch from the small superficial petrosal, likewise a branch of the facial. The palatopharyngei alone receive their nervous supply from the pharyngeal plexus.

Recently Dr. Lermoyez has demonstrated from anatomico-pathological researches what the author likewise has seen—that the muscles of the soft palate receive their motor supply from the spinal accessory.

On leaving the bulb, the nerve-roots forming the internal spinal branch blend with the pneumogastric in the plexiform ganglion, while the external branch runs towards the trapezius and the sterno-cleido-mastoid. From the plexiform ganglion the internal spinal branch descends as the pharyngeal branch, to innervate the whole of the muscles of the soft palate.

The sensory nerves are supplied by the sphenopalatine ganglia.

### Uvula.

This organ varies in form in different individuals. It is usually cone-shaped, the apex pointed, and its base broadening where it blends with the anterior pillars. The apex is sometimes rounded, and occasionally it is found shrivelled up on itself, becoming hammer-shaped, and giving an appearance as if it were the seat of cicatricial contraction, resulting



from deep cauterization. Frequently it is voluminous and oblong, while it is not uncommon to find it bifid, varying in extent from an undulation in the middle line to a complete separation up to its base. The mucous membrane is bound to the underlying tissue by a very loose cellular tissue, which explains the considerable œdematous infiltrations that take place in this situation.

### Tonsils.

The tonsils are situated in the hollows known as the tonsillar fossæ. They resemble a half walnut in shape, the convex part being directed towards the mouth. The dimensions and shape vary considerably in different individuals. Each tonsil presents two surfaces and two extremities. The free internal surface is directed inwards towards that of the opposite side, and is studded over in an irregular manner with a great number of apertures—the crypts. This gland has sometimes a smooth, even, and rounded surface, but at other times it is vertically elongated, and occasionally it may appear as if it were made up of several masses, imperfectly united and separated by deep fissures, generally running in an antero-posterior direction. The crypts lead into sinuous cavities, which may or may not communicate with each other, and which give the tonsils a sponge-like structure. The secretions which accumulate in these cavities have not a ready egress, and it is to this special conformation that we attribute the occurrence of certain infections in this region.

A little beyond this is the maxillo-pharyngeal space, in which lies the vasculo-nervous bundle, which includes the carotid, the internal jugular, the pneumogastric, etc. The internal carotid lies against the external pharyngeal wall, and is separated from the tonsil by the entire substance of this structure—a distance of from 20 to 25 millimetres.

The superior extremity corresponds to the divergence of the pillars of the soft palate. Occasionally we see groups of follicular masses situated on the arch of the posterior pillar,

which look like an extension of the tonsil. At the upper part there are one or more deep crypts, hidden behind the anterior pillar. Pathologically it is important to note this fact, because these recesses form a point of election for certain affections in this region.

In 1897 Killian and in 1898 Patterson both drew attention to this region, called by the former the superior angle of the palatine tonsil, and by the latter the supratonsillar fossa.

Inferiorly the tonsil becomes merged in the border of the tongue, blending with those closed follicles which are scattered about at this level, and which are known as the lingual tonsil. The writer has observed at this level some deep crypts, which open imperfectly on the surface owing to the anterior pillar and the lateral surface of the base of the tongue meeting at a dihedral angle. This explains the occurrence of certain infections occupying the lower part of the tonsil towards the lateral region of the lingual tonsil.

**Structure of the Tonsil.**—The tonsillar epithelium is, like that of the neighbouring regions, paved and stratified. The tonsil itself is composed of adenoid tissue—that is to say, of a series of closed follicles, among which the connective elements penetrate from the submucosa. In the latter are some acinous glands which open into the interior of the crypts.

**Vessels and Nerves.**—The arteries come from the lingual, the inferior pharyngeal, and the superior and inferior palatines; they spread out and ramify in the tonsillar substance among the follicles, penetrating even their interior.

The veins are placed outside. They form a venous plexus on the external wall of the tonsil, and this is worthy of note, as it explains certain hæmorrhages, which sometimes take place after section of these glands. The author, however, has always found, on examination by a strong light, that the blood comes from an arterial rather than from a venous source.

The lymphatics join with those of the dorsum of the

tongue, and lead into the lymphatic glands at the angle of the jaw.

The nerves come from the lingual and glosso-pharyngeal.

### Pharynx.

The pharynx extends from the basilar process of the occipital to the fourth or fifth cervical vertebra. It is an

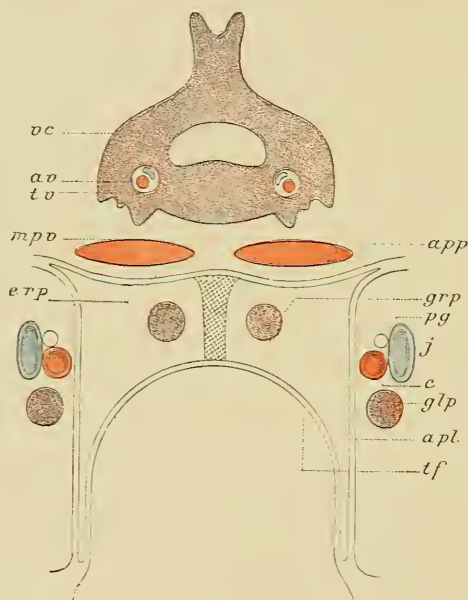


FIG. 2.—DIAGRAMMATIC HORIZONTAL SECTION OF THE RETROPHARYNGEAL SPACE (ESCAT).

*vc*, Cervical vertebra; *fv*, vertebral foramen; *av*, vertebral artery; *mpv*, prevertebral muscles; *grf*, retropharyngeal ganglion; *erp*, retropharyngeal space; *app*, prevertebral aponeurosis; *pg*, pneumogastric; *j*, jugular; *c*, carotid; *glp*, lateral pharyngeal ganglion; *apl*, lateral aponeurosis; *tf*, fibrous layer.

irregular canal, broader above than below, and has a quadrilateral appearance, with rounded corners. It glides on the vertebral column, and thus allows the movements necessary for deglutition and respiration.

It is attached posteriorly to the aponeurosis of the pre-

vertebral muscles; laterally to the carotid and internal jugular, with their accompanying nerves; anteriorly to the posterior nares, the soft palate, the faucial isthmus, the base of the tongue and the epiglottis; and inferiorly to the posterior surface of the arytenoid region, to the aryepiglottic folds, and to the œsophageal opening.

The buccal pharynx is bounded superiorly by a plane passing on a level through the uvula, and inferiorly by another plane traversing the posterior extremity of the great cornu of the hyoid. In the same manner, the incomplete anterior surface is formed by the uvula and the base of the tongue with the aryepiglottic folds as its inferior boundary. The laryngeal portion of the pharynx occupies the space between the hyoid bone above and the superior border of the cricoid cartilage below. In the middle is the epiglottis with its glosso- and ary-epiglottic folds, the inferior wall being formed by the œsophageal orifice. The length of this canal is from 4 to  $4\frac{1}{2}$  centimetres.

The pharyngeal muscles are composed of three constrictors—the superior, the middle, and the inferior; to which must be added the two elevators—the palato-pharyngeus and the stylo-pharyngeus, the latter being a long, narrow, straight muscle springing from the inner sides of the base of the styloid process, and passing obliquely downwards and inwards on to the outer wall of the pharynx.

**Mucous Membrane.**—The mucous membrane of the pharynx is lined externally with a fibrous layer, which is continuous with that of the œsophagus. It is covered with squamous epithelium, and contains in its substance numerous closed follicles, particularly at the level of the lateral parts behind the posterior pillars. It possesses also numerous groups of glands.

**Vessels and Nerves.**—The arteries are derived from the pharyngeal, a branch of the external carotid, and from the pterygo-palatine.

The veins, forming a superficial and deep plexus, flow into the internal jugular.

The higher set of lymphatics enters a gland situate at

the level of the highest part of the superior constrictor (Sappey), while the lower enters a group of glands situate in front of the common carotid, close to its bifurcation.

The nerves issue from the pharyngeal plexus. According to Testut, physiological investigation informs us that the sensibility of the mucous membrane is derived from the pneumogastric, while the vascular and secretory phenomena are under the influence of the superior cervical ganglion. The muscles are innervated by the glosso-pharyngeal and the spinal accessory.

### The Examination of the Pharynx.

Owing, it may be, to the tongue, to the reflexes, or to faultiness in technique, the examination of the throat is not so easy as might at first appear. The practice of asking the patient to put out his tongue ought to be condemned, as it gives rise to many errors.

To examine thoroughly the pharynx it is necessary—

1. To ask the patient to open his mouth widely, and, by fully retracting the lips, to show the teeth.

2. *To keep the tongue in the mouth behind the dental arch*, and thus enable the tongue-depressor to be placed with firm but gentle pressure on the anterior third of that organ. On the patient sounding the vowel 'ah,' the whole cavity may be perfectly examined without causing any reflex nausea. This enables one to see clearly the soft palate, the uvula, the pillars, the tonsils, the buccal pharynx, and, while the soft palate is raised, the lower part of the naso-pharynx.

The apex of the epiglottis is often seen in docile patients, and in the case of children it is almost always possible to see the operculum during the act of swallowing.

If the tongue is refractory and arching takes place, all that is usually necessary is to reassure the patient, so that he may allow successive small taps to be made over its dorsal surface, and gradually this tendency will be overcome, and the organ will lie on the floor of the mouth.

Breathing should be easy in order to enable one correctly



to judge of the appearance of this region, as very often at the first glance the mucous membrane is seen to be red from venous stasis, caused by the difficulty of opening the mouth, and the involuntary contractions made by the patient at the beginning of the examination. With beginners this is a frequent source of error. The size of the tonsils should not be estimated during the act of straining, especially

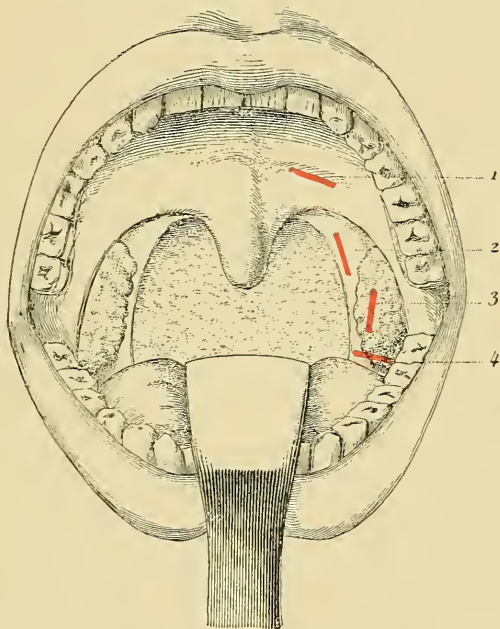


FIG. 3.—POSITION OF THE TONGUE AND OF THE TONGUE-DEPRESSOR DURING EXAMINATION OF THE PHARYNGEAL CAVITY.

1, Soft palate and origin of the anterior pillar; 2, posterior pillar; 3, left tonsil; 4, wall of the buccal pharynx.

in children, as the tonsils may project inwards from the pillars, while in quiet respiration they are nearly normal.

With certain people, or with professional singers accustomed to look at their own pharynx, there is no need to use a tongue-depressor, as they have got into the habit of keeping the tongue well down on the floor of the mouth.

For examinations of the laryngo-pharynx or the base of the tongue the laryngoscopic mirror should always be used.



## CHAPTER II

### PATHOLOGY OF THE PHARYNX

#### **Erythematous Angina.**

A SUPERFICIAL catarrhal inflammation of the pharyngeal mucous membrane.

*Symptoms.*—This condition is specially characterized by general malaise rather than by fever, and by severe pain, particularly on deglutition, the pain being more marked in the case of semi-solids.

On examination, the soft palate, and especially the base of the anterior pillar, show a blotchy redness, more or less vivid, and often there are found scattered over the surface of the mucous membrane, particularly at the angle formed by the tongue and the anterior pillar, whitish erosions, irregular in form.

These very superficial erosions are sometimes discrete, and only occupy a small area of the pharynx, but they may be diffused over the base of the tongue. They may even reach the lingual surface of the epiglottis or its edge, making deglutition very painful.

Aphthous angina shows a great analogy to this form, but has usually mucous patches over the cheeks, lips, edges of the tongue, etc., and the erosions are more regular, deeper and more discrete—two or three at the most. This may sometimes be associated with a variety of urticaria of the pharynx and larynx.

Treatment consists in the use of emollient gargles, alkalies, chlorate of potash, borax, etc., painting of the erosions with a solution of zinc chloride (2 per cent.), or, still better, with a solution of nitrate of silver (2 per cent.). The use of alkalies internally, with milk, Vichy water, eggs, is specially

useful in relieving this complaint. The disease is apt to recur from trivial causes, such as smoking, the ingestion of spiced foods, shell-fish, and, above all, strawberries.

It appears most commonly in spring and autumn, and is more frequent with men than with women. It is quite often seen in young people, while they are cutting their wisdom teeth. In its later stages painting with iodine or astringent gargles is recommended.

### **Erythema Polymorphia.**

This occurs most frequently during spring and autumn, and is encouraged in individuals predisposed to it by eating certain fruits, such as strawberries. It is characterized by the appearance, of a recurring erythema, with little superficial erosions, covered with a thin greyish pellicle, which can be easily removed with a swab. These are situated over the pharynx and soft palate, but more especially over the tonsils or the anterior pillars.

It is generally of short duration—from twenty-four to forty-eight hours—and it resembles a superficial burn. On removing the pellicle a red ulcer of round or crescent shape, outlined by a greyish border, is observed.

These eruptions are found usually on the mucous surface of the cheeks, often on the lips, and even on the back and sides of the tongue. They are very rarely found on the pharyngeal wall.

The characteristic feature of this erythema is the rapidity of its evolution and the ephemeral pemphigal elevation at the beginning, which is difficult to diagnose, as the pellicle of macerated epithelium comes away on the least movement of the tongue or even in deglutition. After healing up it is very apt to return in spite of all treatment.

This lesion may, at the first glance, be mistaken for a mucous patch, but it has neither the opalescent colour nor the red inflammatory border so characteristic of the syphilitic plaque. Besides, the shape is different, the polymorphic erythema resembling leaf-like indentations or festoons,

covered with a membranous pellicle, which is easily removed, and leaving a superficial excoriation. In the middle of the patch the mucous membrane may be perfectly healthy.

Treatment consists principally in the use of alkalies, borated gargles, the painting of the ulcerated parts with a 2 per cent. solution of zinc chloride, after applying cocaine, or the use of the nitrate of silver pencil or a 20 per cent. solution.

### **Pemphigus of the Pharynx.**

This may be acute or chronic.

(a) The acute form is by far the less known. It is difficult to diagnose, as there are no accompanying cutaneous lesions.

*Etiology.*—Its causes are very badly defined. It is seen at all ages, and it is not influenced by the seasons.

*Symptoms.*—Pemphigus usually has a sharp onset, the patient suddenly complaining of acute pain, like that of a burn, in the pharynx. This generally takes place in the morning on waking, or even when taking food.

If the throat is examined one or more blisters are seen over the palate, especially around the uvula. These blisters vary much in size, from a lentil to that of a large almond, and are of oval or rounded outline. The author has seen one large enough to cover the greater part of the soft palate. The fluid contained in these blisters, which may be serous or bloody (hæmorrhagic form), causes the mucous membrane to project. The projection is surrounded by a red border, without any peripheral infiltration.

Pemphigus is occasionally met with on the epiglottis and over the arytenoid cartilages.

At the second stage, when the fluid escapes, a wrinkled, opalescent membrane is left, resembling a broken blister. Soon after it has the appearance of a yellowish or greyish-white fibrinous patch implanted on the mucous membrane. This membrane is surrounded by a reddish border, which is never infiltrated.

Subjectively the patient complains of a burning sensation

in the throat, especially while swallowing warm or salted liquids. Beyond this there are no constitutional disturbances, whereas in general pemphigus the onset is ushered in by severe headache, shivering, and rise of temperature.

The course of this affection is rapid, and one attack gives no immunity, as the author has seen frequent relapses.

The prognosis is most favourable.

*Diagnosis.*—This is to be distinguished from simple erythematous angina, the angina of secondary syphilis, and that caused by the use of certain drugs.

The simple erythematous angina is usually accompanied by feverish symptoms, dry, painful throat, so that deglutition is nearly impossible; besides, the symptoms are quite different from those of acute pemphigus.

In syphilitic angina there is some analogy, but the syphilitic lesion is usually situate on the pillars, the tonsils, the inner surface of the lips, but very rarely on the middle part of the palate. The patch has a carmine-coloured border, and erythema is present, and tumefaction of the pharynx, which ought to prevent confusion in the diagnosis.

The use of certain drugs, such as iodide of potassium and antipyrin, has been known to cause phlyctenular erythematous stomatitis, which might be mistaken for pemphigus proper.

*Treatment.*—This is very simple, as the tendency of the disease is to disappear of itself. During the first few days a semiliquid diet is recommended, preferably alkalinized, such as milk, eggs, Vichy water; later on, cold emollient gargles, heat being disagreeable to the patient. In fine, as much rest as possible should be given to the affected parts.

If the bulla is entire at the time of examination it may be incised.

(b) The chronic form.

*Etiology.*—Chronic pemphigus appears to be a disease of adults, even at an advanced age, and is invariably found in feeble or cachectic individuals. It appears to be specially frequent in Germany and Austria.

This form is usually subsequent to general affections,

spreading from the skin to the buccal mucous membrane, from thence to the pharynx, and even to the nose and larynx. The conjunctivæ are affected. The course of extension is very irregular. The skin lesions may precede those of the mucous membrane by six weeks to three years. Some believe this is a primary lesion, and that the mucous membrane is affected two, three, or even four months before the skin. The pemphigus may assume the foliaceous or bullous form.

Finally, cases are observed where the pemphigus remains localized in the mucous membrane without reaching the skin.

*Symptoms.*—As a rule, chronic pemphigus is very insidious in its onset, the patient complaining of abnormal dryness in his throat, or of slight pain during the act of deglutition of hot or spiced foods. Epistaxis and the separation of false membrane occur where the nose is affected. This condition may go on for months or years without the patient knowing that he is ill, until the disease has made such progress that he seeks advice.

It is rare to find the bullous stage, as this is so ephemeral. When present, the bullæ exhibit the same translucent or blackish appearance as in acute pemphigus. When the bulla has broken, there remains in its place a fibrinous exudation, yellowish-white in colour, wrinkled, and of fairly regular form. This membrane is generally attached to the mucous membrane in all its extent, but one of the edges may be seen to be raised, and through the movement of the tongue and deglutition it is detached, leaving the red mucosa sometimes granular or blood-stained. In four to ten days at most it heals up, without leaving a cicatrix.

On the conjunctivæ the fibrinous exudation is followed by ulceration and by adhesions between its palpebral and ocular layers, and the cul-de-sac tends to disappear. The cornea ulcerates, and becoming vascular and sclerosed, forms a true pannus.

The sight becomes feeble, and finally is lost, either from corneal opacity or from the gradual compression and



atrophy of the optic bulb. In graver forms the successive bullæ are very close to each other, forming thick exudates, covering over the mucous membrane of the soft palate, tongue, gums, nose, pharynx, and even the arytenoids, vocal cords, and trachea.

The healing of these tissues is slow; ulcerations form, which leave synechiæ or cicatrices behind. The functional symptoms depend on the seat and the nature of the lesions. If they are large or deep, discomfort and even acute pain are felt, especially during deglutition. Even respiration may be affected, owing to the nares becoming blocked with thick crusts.

Fever is absent, but in grave and rapid forms each eruption may be ushered in with headache or even shivering.

As a general rule, the lymphatic system is unaffected.

The duration of the disease is extremely variable; sometimes the course is very slow.

In the still graver forms early ulceration supervenes, rendering the taking of food difficult.

The prognosis depends on the mode of development, its form, and especially on the susceptibility of the individual. Occasionally the affection remains stationary for several years, or it may occur for some months, with periods of very marked improvement; but it is rare not to have relapses, and a cure has not been recorded.

As a rule, bacteriology does not help us much, having usually a negative result.

Kapozzi found on post-mortem examination sclerosis of the lateral columns of the cord. Atrophic functional disease of the nervous system might explain the appearance, and, above all, its essentially chronic relapsing nature.

The diagnosis of pemphigus isolated on the mucous membrane is very difficult, especially if the case is not seen during the bullous condition. At first it might be confused with an erythematous stomatitis or even secondary syphilis. The former, however, is temporary and extremely painful, while the latter is usually accompanied by other bullæ, which point to a diagnosis.



*Treatment.*—General treatment is of no avail. Mercury and iodide of potassium only aggravate the condition. Large doses of Fowler's solution (Hutchinson) in 20 to 30 drop doses appear to benefit its course slightly.

Local treatment by means of washes and gargles, emollient or alkaline, and attention to the hygiene of the mouth, subdue to some extent the pain and check its course. If the pain is very sharp, insufflations of orthoform, pure or mixed with borate of soda, are useful, as well as the local application of a solution of cocaine and glycerine.

The diet should be nourishing, and neither spiced nor hot.

### **Acute Catarrhal Angina—Tonsillar Congestion.**

This is an acute inflammation, circumscribed or diffused, of the pharynx, characterized by redness and slight swelling.

*Etiology.*—Acute pharyngitis occurs at certain seasons, especially during summer. It appears to be common in rheumatic subjects, where it assumes the character of tonsillar congestion. Although it is not easy to establish the relation of cause and effect between rheumatism or gout and this particular form of affection, yet it is none the less true that there has been observed in some individuals the coexistence of a fleeting pain in the joints, acute muscular rheumatism or catarrhal angina. In some cases they alternate. Damp and chill are the usual causes of this affection, which exhibits frequent relapses.

The onset is usually acute, accompanied by malaise and slight gastro-intestinal disturbance. This is followed rapidly by painful sensations in the throat, increased by movement of the tongue or palate. Though less acute than in the exudative forms, the pain may be so intense as to hinder deglutition. It may be felt over all the pharynx or on one side, according as the lesion is general or local. It is usual for the pain, especially in rheumatic forms, to be worse in the evening, or after prolonged use of the voice.

On examination in the localized form, redness over one of the pillars and tonsil is seen.

In the diffuse variety the soft palate, the uvula, and the anterior pillars are involved; the uvula may be œdematous. In this affection there is no exudation or glandular enlargement.

The localized form is most usually seen in rheumatic patients. In mild cases recovery may take place in forty-eight hours, but it may be prolonged for five or six days at most.

The manner of onset, progress, and the absence of pul-taceous tonsillar exudation enable one to make a diagnosis. Early erythematous syphilis of the pharynx may be mistaken for this affection, but generally in the syphilitic lesion inflammatory symptoms are much less acute and the pain is less severe; besides, there is no infiltration of the parts. The progress of the disease soon confirms diagnosis, if there should have been any doubt.

The angina of scarlet fever covers not only the pharynx but the entire buccal cavity, particularly the inner surface of the cheeks. The purplish-red colour is almost characteristic of the affection. There is often an exudation on the tonsillar crypts, and in every case the temperature, the violence of the general infection, and the existence of the cutaneous eruption point to the diagnosis.

Pharyngeal urticaria has a rapid course, alternating usually with gastro-intestinal disorder or with similar skin symptoms, and is especially developed after the ingestion of certain foods (fish, crustacea, shell-fish, mussels, strawberries, cherries, etc.), or from over-indulgence.

*Treatment.*—Alkaline gargles, warm inhalations, intestinal antiseptics, as salol, sulphate of quinine, benzoate or salicylate of soda, with milk diet, are indicated.

### Acute Tonsillitis.

A diffuse inflammation of the pharynx, characterized by redness and swelling, and by a whitish deposit over the tonsil.

*Etiology.*—This affection is much more common in children

and during adolescence, and is rare in old people on account of the loss of lymphatic tissue.

The shape of certain tonsils and the existence of previous attacks render the patient liable to a recurrence of the disease. The most common cause is a chill. It may follow certain traumatisms, as cauterization of the nasal mucosa or of the lingual tonsil, and puncture of the maxillary sinus.

Climatic changes play an important rôle, and nasal obstruction, adenoids, and empyema of the accessory sinuses all predispose to this lesion.

*Symptoms.*—The disease is usually announced by shivering, severe headache, malaise, and fever. This is slight, or if the tonsillar inflammation be severe the temperature may reach from  $39^{\circ}$  C. to  $40^{\circ}$  C. It soon falls, but rises again, and in a more violent form, after twenty-four hours. Very soon the patient complains of uneasiness in the throat, on one side or on both, according to whether the inflammation is localized or diffused. This passes into severe pain, often extending to the ears, and is increased on movement of the tongue, deglutition, etc. In children movements of the head and neck are difficult; the submaxillary or the cervical glands are painful and inflamed, and even produce a torticollis. The voice becomes nasal, thick, and tonsillar, the tongue foul, the appetite moderate, with persistence of malaise and depression.

On examination during the first stage a simple diffuse redness is seen occupying the site of the tonsils, and in many cases the uvula. As early as the second day a whitish coating appears on the swollen and enlarged tonsillar crypts. This does not cover the gland, but is more or less discrete, a dirty greyish pultaceous exudation being studded here and there in patches, between which the red and inflamed mucous membrane can be seen.

If inflammation has spread to the lateral walls of the pillars, or even to the orifice of the tubes, earache, deafness, and tinnitus may be complained of.

About the fourth or fifth day the symptoms abate, deglutition becoming easier.

If both sides have been affected, the patient soon recovers; but, as it often happens, the affection may have been unilateral, and the other side is now attacked. In these cases the febrile symptoms are slightly less intense, but they may—especially in children—become very violent.

As a rule a cure is obtained, but, in young people chiefly, hypertrophy may take place and the tonsils become the seat of chronic inflammation.

*Complications.*—The usual complications are abscess in the tonsil, chronic or suppurative adenitis, slight arthritis, nephritis, endocarditis, perichondritis, and otitis. Palatal paralysis is not very rare after a severe though simple angina. Perhaps this may be connected with diphtheria or other infectious anginae without the production of false membrane, and yet in the bacteriological examination of several analogous cases the author has only found streptococci and diplococci.

*Diagnosis* is nearly always easy. In the angina of scarlet fever the tonsils are generally bilaterally affected from the first, the pharynx and the soft palate being bright red, smooth, and without œdematous infiltration.

The tonsils are often covered by a pultaceous white deposit, which is not removed by brushing over with a solution of chloride of zinc. The duration of the angina is longer, and the mouth, tongue, and lips preserve for several days the smooth, dry, characteristic carmine tint. The progress of the fever and the duration of the disease scarcely permit of a mistake in diagnosis, not to speak of the cutaneous eruption, which is found nearly always on certain parts of the body—hands, feet, arms, and the internal surface of the thighs.

Herpetic angina and folliculitis may be confused, and this the author believes often occurs in practice.

*Treatment.*—The administration of tincture of aconite or of quinine, with a saline purge, is very satisfactory.

Locally the author prescribes, where there is much pain, inhalations three or four times a day for five to ten minutes. Emollient gargles, especially alkaline, are also recommended.

R	Biborate of soda	}	...	...	āā 4 grammes	}	gr. 60
	Benzoate of soda						gr. 60
	Spirit of peppermint ('alcool de menthe')		...	...	5	„	℥lxxx
	Pure glycerine		...	...	50	„	5xi
	Decoction of barley and coca-leaves		...	...	450	„	5xvi

To this gargle add two-thirds of hot marsh-mallow water, and use it to bathe the throat every hour or two, according to the severity of the inflammation.

The diet should be simple, eggs and milk food for the first three or four days.

If inflammation is observed at a very early stage, or even later, the part might be painted with a solution of zinc chloride, 1 in 20 or 1 in 30.

The author uses the following :

R	Chloride of zinc	...	1 gramme	gr. 30
	Hydrochloric acid	...	$\frac{1}{2}$ drop	℥i
	Hydrochloride of cocaine	...	10 to 20 centigrammes	gr. 3 to 6
	Glycerine	...	5 grammes	5ii
	Distilled water	...	20 to 30 grammes	5x to xv

This should only be applied once, and not later than forty-eight hours after the onset.

Another good formula is :

R	Biborate of soda	...	4 grammes	gr. 60
	Hydrochloride of cocaine	...	15 to 20 centigrammes	gr. 2 to 3
	Pure glycerine	...	15 grammes	5iiss

This is preferable to employing syrupy materials, as it is aseptic as well as sweet to the taste.

When the submaxillary or cervical glands are very painful, and if any torticollis be present (children's angina), the application of tincture of iodine, warm poultices, or wadding gives excellent results.



## Herpetic Angina.

An acute inflammation of the pharynx characterized by a growth of herpetic vesicles scattered over its surface.

*Etiology.*—This is difficult to determine.

Predisposition plays an important part, one attack predisposing to others. The disease is more frequent in adolescence and in adult age.

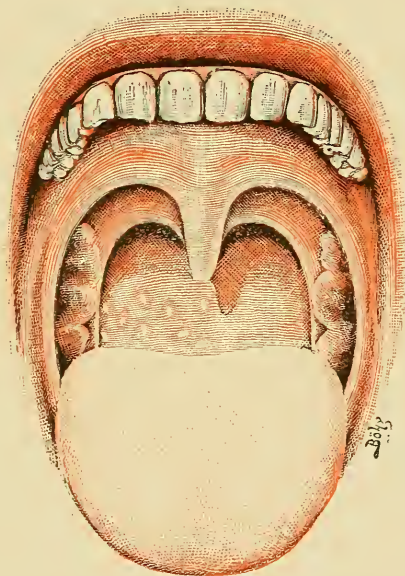


FIG. 4.—HERPETIC VESICLES ON THE PHARYNGEAL WALL.

*Symptoms.*—The onset is usually sudden, with shivering, lassitude, and anorexia.

The temperature rises rapidly to  $39.5^{\circ}$  C. to  $40^{\circ}$  C., or over. After twenty-four to thirty-six hours' time, deglutition is considerably interfered with, so that the patient can neither swallow solid nor liquid food.

On examination of the pharynx, congestion and tumefaction can be observed over the pillars, soft palate, and pharyngeal wall. A crop of vesicles scattered in groups then appears. They may also be seen on the base of the



tongue and epiglottis. If they occur on the lips they rupture early, and form a characteristic brownish-yellowish crust. The size of each vesicle is about that of a hemp-seed. It is at first filled with a transparent, slightly turbid liquid. In a few hours the vesicle ruptures, leaving a round greyish surface, surrounded by an inflammatory border.

The eruption takes place either all at once or in successive groups, accompanied by fresh feverish symptoms. Glandular involvement is generally little marked. The principal symptom is intense pain on deglutition, which is more severe in proportion to the diffusion of the eruption as well as to its position—*e.g.*, the epiglottis or lingual tonsil.

This disease usually lasts from four to six days. Complications are rare; the inoculation of diphtheria on the ulceration is the only grave one.

The prognosis is good.

In some cases there is difficulty in making a diagnosis. At the onset it may be confused with simple tonsillitis, erysipelas, or scarlatina, till the appearance of the vesicles. The only important differential diagnosis is between it and diphtheritic angina, when the false membrane is present. The following points should settle the diagnosis—*viz.*, the sudden onset, the very high temperature, the existence of herpetic vesicles on the soft palate, lips, pharynx, and base of tongue. The functional symptoms are also generally more marked in herpetic angina than in diphtheria. Dysphagia, which is very intense in the former, is less marked in pseudo-membranous angina, and glandular involvement is more pronounced in the latter than in herpes.

On the other hand, if diphtheria were grafted on a herpetic angina, the symptoms would be graver and the fever more persistent. If in doubt, it should be treated as a case of diphtheria, and still more so if bacteriological examination shows the presence of the Loeffler bacillus.

Herpes of the pharynx (the 'zona pharyngé' of Herzog, Lermoyez, and others) is distinguished from ordinary herpetic angina by the following points: less general constitutional disturbance, pains more neuralgic, and with

occasionally a burning sensation. According to Lermoyez, the pain diminishes, when the vesicles appear.

The distribution is generally unilateral, and in the region supplied by the superior maxillary nerve. Its duration is longer than in herpetic angina, and may extend from fifteen to twenty days. Lastly, one attack usually protects the individual from others.

*Treatment.*—An alkaline purgative, or quinine, with or without antipyrin, are very efficient remedies.

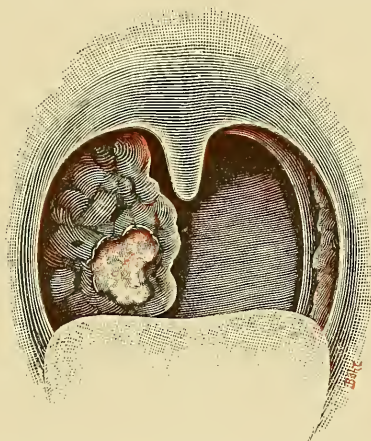


FIG. 5.—ACUTE LACUNAR ULCERATION, SITUATE AT THE INFERIOR PART OF THE RIGHT TONSIL, WHICH IS HYPERTROPHIED ANTERIORLY.

Locally, alkaline gargles, with borax, are indicated, or the following paint :

R	Solution of carbolate of soda	1 gramme	℥ xv
	Resorcin	... 5 centigrammes	gr. 7½
	Glycerine (neutral)	... 50 grammes	℥ xi

Paint the throat once daily. General tonic treatment is also recommended.

### Acute Ulcerative Lacunar Tonsillitis.

The author believes he is the first to describe under this name a special form of tonsillitis, characterized by an extensive crateriform ulceration.

*Etiology.*—This condition is seen more frequently in spring and autumn, and may occur as an epidemic. It is rarer in children and in adults above forty, and is chiefly observed in those who are debilitated, or have received a chill.

There is no doubt that the lacunar disposition of the tonsils, the depth of the crypts, their comparatively small apertures, and the existence of caseous tonsillitis, all predispose to this affection. The ulcerative process appears to be of microbic origin, yet the bacilli discovered, whether by direct growth or by cultivation, are varied—streptococci,



FIG. 6.—ACUTE ULCERATIVE LACUNAR TONSILLITIS.

In this case two ulcers appear on the left tonsil—one superiorly (shown in profile), the other inferiorly (shown full-face).

pneumococci, sometimes staphylococci, fusiform bacilli, spirilli, and a long, thin bacillus of uncertain nature.

Thus, although we admit the microbic nature of the ulceration, we must seek the cause of it in the acute inflammation of the crypts themselves, whose products of desquamation cannot get free, either by the blocking of the orifice or the superdilatation of one or several lacunæ. It is from the rupture of those crypts that the anfractuous cavity, filled with epidermal detritus, is produced, as well as the deformed

follicles observed in those cases. The loss of substance is similarly explained.

*Symptoms.*—The onset of the disease, sometimes febrile, is, for the most part, insidious, and may pass unobserved, till the patient begins to experience a slight difficulty or pain in deglutition. This pain, localized at the level of the tonsil, shoots up to the ear of the diseased side. The buccal lesion consists in an ulceration of greyish appearance, covered with caseous material, readily detachable with the cotton mop, leaving a blood-stained, reddened surface.

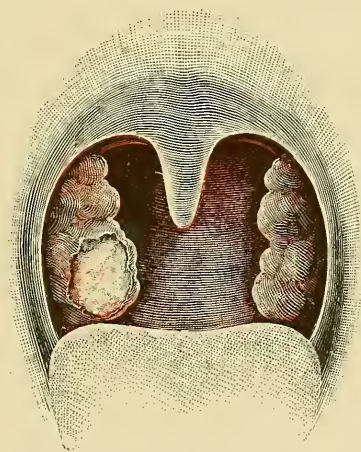


FIG. 7.—ULCERATIVE LACUNAR TONSILLITIS OF THE RIGHT TONSIL.

The edges are slightly red, clean, punched out, and bleed easily. They are not infiltrated. The lesion is very like that produced by the thermo-cautery, when the slough is beginning to separate. The tonsil is not enlarged, and the pillars are not involved. The lymphatic system is not generally affected, and the buccal mucosa remains intact.

Pathologically, we can consider it as having a pre-ulcerous and an ulcerous stage. In the former we find an encysted lacunar tonsillitis, *either latent* or in process of ulceration. When latent it can readily pass unnoticed. Its contents are composed of a hyaline material, which does not readily stain

with epithelial reagents, and no nuclei are seen. They appear to be sterile, as the examinations both by Gram's reagent and cultures are negative.

When ulceration is about to take place, small white elevations appear on the tonsil, which show the following characteristics: The thin epithelial wall which lines the cyst is destroyed here and there; the caseous contents show degenerated epithelial cells; the neighbouring tonsillar tissue has undergone modification, and shows necrotic islets surrounded by inflammatory tissue, with engorged vessels.

Numerous streptococci and staphylococci are found by Gram's method.

In transverse section the ulcer is seen as a notch, in which the tonsillar epithelium is wanting. The epithelium at the edges is disorganized, no cellular structure being definable either here or in the sclerosed tonsillar tissue.

Bacteriological examination in these ulcerative forms shows the presence of streptococci, diplococci, fusiform bacilli, and others.

*Course—Duration—Termination.*—This ulceration, as a rule, progresses similarly to that of a wound made by the cautery. After a duration of four to five days it begins to heal from the edge and base, and eventually appears as a large sinuous cicatrix. In some cases the author has seen the centre of the tonsil cut out, as if morcellement had been performed. It is thus a localized benign gangrene. Recurrences are exceptional.

*Diagnosis.*—This should be simple. It should not be mistaken for acute tuberculosis of the tonsil, there being no resemblance in appearance, symptoms, or course.

In chronic tuberculosis (lupus) the borders of the ulcer are always red and infiltrated, and become lost by degrees in the healthy tissue. The ulceration is not deep, and we have the development of pink nodules. Lastly, its growth is by successive stages, and of long duration.

As regards malignant tumours, diagnosis is easy, as in carcinoma we see the general tonsillar swelling and the characteristic glandular involvement. Mucous patches are more superficial, diffuse, and more lasting than the simple



ulcer. On the other hand, ulcerated gummata simulate slightly this affection from their carbuncle-like appearance. Their base shows a bleeding, fungous-like reddish surface; but they are irregular in shape, often multiple, the borders being red and infiltrated, and not well defined. The ulceration attacks as well, and even by preference, the pillars and the posterior pharyngeal wall. Further, the course of the disease, with its characteristic cicatricial synechiæ, would make the diagnosis certain.

The prognosis is favourable.

*Treatment.*—Our aim should be to keep the parts as clean as possible by using antiseptics. A solution of zinc chloride on a cotton-wool mop is applied to the parts.

R Hydrochloride of cocaine	25 centigrammes	gr. 7½
Zinc chloride ...	... 1 gramme	gr. 30
Hydrochloric acid ...	... ½ drop	℥ i
Pure glycerine ...	10 grammes	ʒiv
Distilled water ...	10 to 20 grammes	ʒv to x

An alkaline gargle and borated solutions are also suggested.

R Biborate of soda }	... āā 6 grammes	{ ʒiss
Benzoate of soda }		{ ʒiss
Tincture of eucalyptus ...	10 grammes	℥ clx
Glycerine (neutral) ...	150 grammes	ʒiv

A teaspoonful added to a glass of tepid water should be used as a mouth-wash several times a day.

If the ulcer does not show signs of rapid healing, we may paint the surface after forty-eight hours with a solution of zinc chloride.

General tonic treatment and light diet (milk, eggs, with Vichy or alkaline water) are highly recommended. Smoking should be prohibited, till cure has taken place, which should not be long, provided that the treatment is regularly and scrupulously carried out.

### **Ulcero-membranous Angina.**

An inflammation of the pharyngeal cavity, resembling stomatitis. It is also known as Vincent's angina.



*Etiology.*—It occurs more frequently in males from eighteen to thirty, and in children it is less rare than is supposed. It appears specially in subjects who are debilitated from whatever cause.

*Symptoms.*—This ulcero-membranous tonsillitis may occur along with or apart from stomatitis. Its onset is marked by slight fever, general fatigue, and a feeling of uneasiness, rather than by pain in the throat.

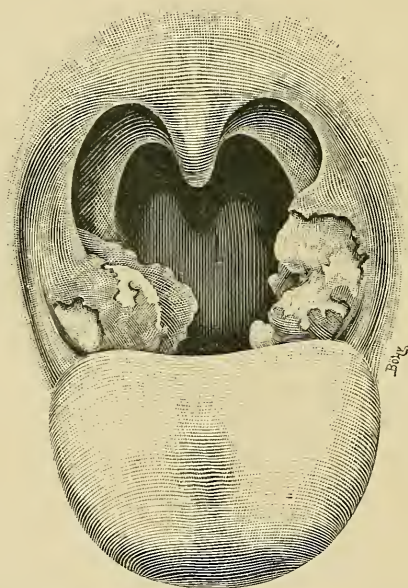


FIG. 8.—APPEARANCE OF THE TONSILS AND THE PILLARS IN A CASE OF ULCERO-MEMBRANOUS TONSILLITIS.

On examination, a false membrane, white or greyish-white in colour, is seen, the edges of which are slightly prominent and surrounded by a well-defined inflammatory zone. The tissues in the immediate neighbourhood are red and inflamed. Underneath this membrane there is an eroded, easily-bleeding surface. *This is situate not only on the tonsil, but also on a part of the anterior or posterior pillars, and may even spread to the palate and uvula.* The submaxillary

glands and those at the angle of the jaw become swollen, but not very painful. If the progress is not checked, a profound invasion of the tissues takes place, with the formation of deep ulcers with irregular, sometimes bevelled, edges. The base is covered with a pseudo-membrane of a reddish-grey colour. When this is raised a granular surface is exposed, which bleeds easily. This membrane generally becomes reproduced when removed. *It is, indeed, a gangrenous process*, originating on the surface and penetrating downwards. The tonsil thus infected is inflamed, as well as the palate and pillars. The breath is fetid, and the glandular swelling is considerable and painful to the touch. There is little or no fever, the temperature thus being not proportional to the local and general symptoms. Along with this there is a feeling of fatigue and disinclination to work, and dysphagia, especially if both tonsils are involved.

*Course—Duration—Termination.*—The course of this affection is fairly slow. It may be prolonged for weeks, if the sufferer is debilitated, etc., but under favourable conditions it usually resolves in from eight to fifteen days.

Recurrences are not extremely rare, recovery usually taking place. The author has seen cases where the tonsils became almost completely sphacelated. This has also occurred in children on the uvula and a portion of the palate.

The *prognosis* is generally favourable, but fatal results have occurred in children. It is important to know, if in those cases there was no diphtheria present, or ulcero-membranous tonsillitis accompanied by stomatitis of the same nature. Bacteriological research demonstrates the existence of numerous fusiform bacilli, with, in most cases, a spirillum, along with other micro-organisms, as the streptococcus, diplococcus, coli bacillus, etc. It thus in appearance, both pathologically and bacteriologically, resembles ulcero-membranous stomatitis, of which it is the tonsillar form.

In most cases the author has not found diphtheria bacilli.

*Diagnosis.*—This form is often mistaken for acute ulcerous lacunar tonsillitis. The former originates and spreads from the surface downwards, while the other, on the contrary,

spreads from within outwards. As regards site, ulceromembranous tonsillitis is localized partly on the tonsil, pillars, and palate. In ulcerous tonsillitis the adjacent area is not inflamed, but is so in the ulceromembranous variety. Finally, the co-existence of ulcers in the mouth, on the lips and gums, suggests the ulceromembranous form.

*Treatment.*—Seeing the analogy between these two forms, one would be inclined to treat them on the same lines. Chlorate of potash the author considers the most rational remedy to be given, both externally and internally. It may be used in the form of a gargle or as a lozenge. The patient should be placed in healthy surroundings. A teaspoonful of bicarbonate of soda to  $\frac{1}{2}$  litre of water, to which some ‘alcool de menthe,’ or other aromatic, may be added, is useful as a mouth-wash. Oxygenated water, or, still better, boro-oxygenated water, 12 volumes being mixed with three-fourths of boiled water, also makes an excellent antiseptic; so does a formaline solution, 1 to 5,000.

A mouth-wash may be as follows:

R Biborate of soda	} ... āā 5 grammes	{ gr. 75
Benzoate of soda		
Sterilized water	} ... āā 15 grammes	{ ̄iv
Pure glycerine		

This is a most useful application.

Chlorate of potash is a wonderful specific, but must be used with prudence, as otherwise it may become irritating.

### Pseudo-membranous Angina, Non-diphtheritic.

An inflammation of the throat associated with the formation of false membranes, but without the presence of the Klebs-Loeffler bacillus.

*Etiology.*—This affection, known for a long time as diphtheroid angina, is far from rare, and is similar in its etiology to the other inflammatory affections of this region. It is the result of cold, of surgical traumatism of the tonsils, or of organs more remote, as in the nasal fossæ, of debility, and

sometimes contagion. Some of these anginae are secondary. Rarely seen in small-pox, it is more common in measles, and especially in scarlet fever, either at the beginning of the disease or during convalescence, and it generally assumes a malignant course. Bacteriologically, there may be found pyogenic streptococci, staphylococci, pneumococci, or even the common *Bacterium coli*, either isolated or associated with other microbes. No special microbe exists for this particular form of inflammation.

*Symptoms.*—Primary or secondary diphtheroid angina has a well-marked onset—fever, rigors, with the development of a yellowish pseudo-membranous exudation over the tonsils, invading the pillars, soft palate, and uvula. This membrane is buff-coloured and thick, and can be readily stripped off in a single piece, showing a mould of the tonsils, etc. The mucous membrane underneath is red, inflamed, and swollen, but there is no ulceration. Regrowth of the false membrane may take place, but it is thinner and less extensive than the original exudation. Locally the patient complains principally of dysphagia, with slight pain, ‘snuffling,’ and on swallowing fluid often regurgitation from the nose. The breath is fetid and the submaxillary glands swollen, specially with children. This symptom is less pronounced than in true diphtheria.

The general condition is fairly well maintained. Among unweaned children we frequently observe grave symptoms—nasal discharge, great prostration, with rise of temperature, even resulting in death.

*Course.*—This non-diphtheroid affection is usually rapid in its course, the febrile phenomena disappearing in twenty-four to forty-eight hours. In a week the disease abates. Examination at this period shows redness, with diminished movement of the uvula. Sometimes, however, slight paresis occurs on one or both sides.

*Complications.*—Though usually confined to the pharynx, the exudation may pass upwards into the nasal fossæ, or downwards and attack the aryepiglottic folds. The most frequent complication is the adeno-phlegmon or retro-pharyngeal abscess.

*Diagnosis.*—This is usually easy. The membrane is thicker and more leathery than that seen in true diphtheria. Bacteriological examination determines the diagnosis.

*Treatment* consists in keeping the part aseptic by means of alkaline washes of borate or bicarbonate of soda—1 teaspoonful to  $\frac{1}{2}$  litre of tepid water. The false membrane should be removed early, and the affected parts painted over with the following once or twice a day without rubbing :

R Hydrochloride of cocaine ...	30 centigrammes	gr. 5
Salicylate of soda ...	2 grammes	gr. 30
Spirit of peppermint ('alcool de menthe') ...	... 10 drops	℥ x
Glycerine ...	... 15 grammes	ʒiii

A general mild tonic treatment is also recommended as soon as the inflammatory symptoms have disappeared.

### Diphtheritic Angina.

An inflammation of the pharynx due to the Klebs-Loeffler bacillus, accompanied by symptoms of general infection from the absorption of the toxin generated there.

*Etiology.*—Klebs in 1883, and Loeffler in 1884, demonstrated that this disease was due to a bacillus, which has received their name. Besides causing the exudation it also produces a toxin, which, becoming absorbed, gives rise to systemic poisoning. In addition to this Klebs-Loeffler bacillus, we find the presence of other microbes, which intensify or modify the nature of the disease.

The specific organism is rod-shaped, straight or curved, twice as large and of a length equal to that of the tubercle bacillus. In order to recognize it, it is necessary to cultivate it on gelatinized serum in the following manner: Take a small metal probe with a flattened point; heat it to redness over a lamp. When cold, rub lightly over the inflamed area, to obtain a portion of the membranous exudation, and introduce the probe into the sterilized gelatinized serum. Close the orifice of the tube with cotton-wool, which is first singed to prevent contamination, and place it in a



drying-chamber at 37° C. for seventeen to eighteen hours. Little greyish-white colonies, with opaque centres, are then seen coming to the surface. A portion of this is taken and stained with Loeffler's blue, when the characteristic bacillus is recognized. The longer the bacillus, the more virulent is the disease, according to some authors.

The combination of Loeffler's bacillus with other pathogenic bacteria constitutes always a graver prognosis. The best method of estimating the exact degree of virulence of these pathogenic organisms is to inoculate pure cultures into the guinea-pig, when death usually occurs in thirty to forty hours from diphtheria.

The chemical nature of the toxin is not yet clearly known, whether a tox-albumin or a nucleo-albumin. Whatever it is, it is known that diphtheria is an infectious, epidemic, and contagious disease, which confers no immunity, and which specially attacks children. It is contagious before the appearance of the false membranes, and continues so for some time after they have completely disappeared.

If a bacteriological examination be made a month or two after the apparent recovery, the characteristic bacilli can be seen. The contagion may be spread in many ways—by the air, hands, bedding, garments, the false membranes, etc. The soil has an important bearing on its development and prognosis. Children, if placed in bad hygienic surroundings, are more liable to be attacked by virulent types.

*Symptoms.*—We may look upon this disease as having two types: one a benign form, which is mono-microbial, and the other—graver or toxic cases—bacillo-coccic, streptococcic, etc.

#### A. THE BENIGN ANGINOUS TYPE.

The onset of diphtheritic angina, whatever its form, is usually insidious, with an incubation period of five to eight days. There is often a feeling of malaise, fever, loss of appetite, headache, diarrhoea—in a word, the signs of a general infection. A few days after this the child complains of slight sore throat, and although the pain is not severe,



yet the cervical submaxillary glands are already swollen. The general symptoms now rapidly become worse: the patient is pale and fatigued, and the appetite almost entirely lost. The fever is constant, though moderate. The voice becomes nasal, tonsillar, sometimes even croup-like. In other cases the attack may be very sudden, with high fever, shivering, convulsions, and even delirium, followed by the development of the false membrane. This type is frequently mild.

Examination of the throat during the early stage shows a slight redness. Twenty-four or forty-eight hours later, a thin, greyish-white, pellicular spot appears, which, on being stripped off, leaves a bleeding, non-ulcerated surface. This false membrane is reproduced very rapidly, and spreads more extensively over the surface. At other times isolated patches over the tonsils coalesce and form a dirty-grey exudation, which may extend over the pharynx, base of tongue, epiglottis, the aryepiglottic folds, and even into the larynx. The patient may now convalesce, or general toxæmia may supervene. If the membrane has spread down to the larynx, the characteristic symptoms of croup appear. In mild cases, the urine does not contain albumen; but if toxæmia takes place, albuminuria may be present in this benign form.

#### B. INFECTIOUS POLYMICROBIAN TYPE OF ANGINA.

The onset may resemble that seen in the benign, but the general phenomena are much more intense. Albuminuria appears very early. The false membrane has a tendency to invade the neighbouring parts (the nasal fossæ, larynx, mouth, etc.). Regurgitation of fluids with great fetor occurs, along with pronounced cervical and submaxillary adenitis.

The course may be rapid, and the child die in spite of any specific treatment. The quantity of albumen is found on analysis to be very considerable, and the depression is great. The throat may show very slight local lesions in these cases; the voice is altered, the cough is croupy, and bronchitic râles are heard. These may resemble ambulatory

typhoid cases, the patient dying from the diphtheritic virus.

*Pathology.*—The signs of a grave systemic poisoning are present, the blood black, coagulating badly after death, and containing a large number of white globules. The spleen is enlarged, the liver congested, and both infiltrated with round cells. The hepatic cells are overladen with fat. The kidney shows acute inflammatory lesions. The endothelial cells of the capsule are swollen with exudation between the capsule and the glomerulus, with marked desquamation in the convoluted tubules. There is great infiltration of white globules along the straight tubules and the vessels. The heart is dilated, and shows muscular degeneration. In the nervous system acute myelitis of the anterior horns is met with, and particularly peripheral neuritis. The paralyzed muscles undergo granular and fatty degeneration.

*Complications.*—When the exudation reaches the larynx, it constitutes what is known as croup. The skin may be also affected, and present a scarlatiniform erythema purpura or ecchymosis. Glandular swelling and arthritis may be present. Acute myocarditis may cause death through syncope.

Albuminuria is so frequent a complication of grave diphtheria, that it may be looked upon as a symptom. Finally, it must be remembered that diphtheria occasionally attacks the nervous system, the muscles of the throat, soft palate, œsophagus, or tongue, etc. The ocular muscles are frequently affected, likewise the organs supplied by the vagus.

*Course.*—Its duration depends greatly on the nature of the bacillus, on the power of resistance of the individual, and also on the nature of the treatment. Convalescence is usually long, and the patient should be kept under observation, as death from sudden syncope may take place.

*Prognosis.*—This should be guarded. Besides the presence of the local manifestations, the existence of toxæmia must be remembered, and the possible complications which are liable to occur suddenly when least expected. Since the serum treatment has been introduced, the prognosis has been greatly altered for the better.

*Diagnosis*.—Though it is difficult in many cases to diagnose diphtheritic infection, yet bacteriological examination makes the diagnosis much easier. The author is of opinion that the clinician should not only base his diagnosis on the result of the bacteriological examination, but also on the course of the disease, and the general and local symptoms, and in this manner he will be enabled to establish with some degree of certainty the diagnosis, as well as the gravity of the disease.

*Treatment*.—This is much simplified since the introduction of Roux's serum into therapeutics. As soon as diagnosis is

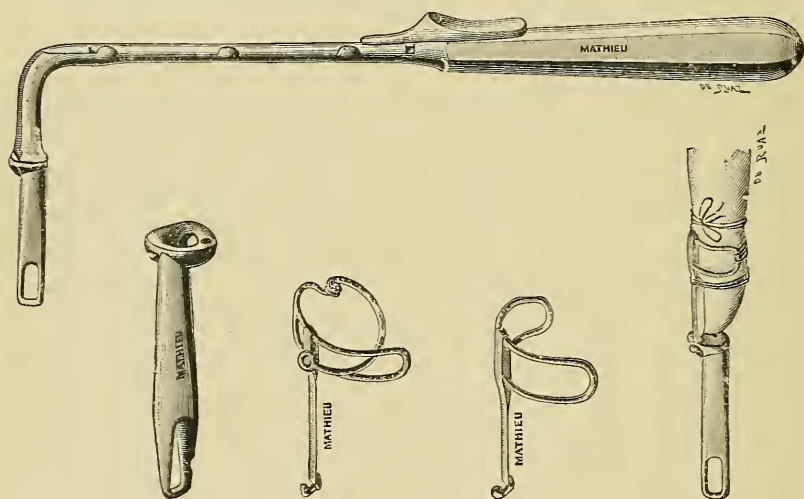


FIG. 9.—FROIN'S TUBES, WITH INTRODUCER AND EXTRACTING HOOK.

established by clinical and bacteriological data, isolate the patient, place him in a well-lighted room, and by means of carbolyzed steam vapour, to which some oil of eucalyptus is added, produce a humid atmosphere. The strength of the child must be maintained against the intoxication.

Locally, a mouth-wash may be given, such as a weak carbolic or alkaline solution. On the first indication use antitoxic serum. It should be given as early as possible. If used at the beginning, a dose of 10 to 20 c.c., according to age, will be sufficient; but if later, when intoxication is

already pronounced, larger doses must be employed. Certain authors even advise in young children of a few months to a year old the use of 20, 30, or even 40 c.c. As a general rule, it is advisable to inject 1 c.c. for every month up to two years of age. These injections must be made aseptically, sterilizing the skin and instruments. The effect of the injection, if given early, is rapid, the general state of the child improving, false membranes becoming detached, and convalescence hastened. Since the introduction of this treatment the mortality has greatly decreased—at least, when the serum has been early employed—so that now diphtheria is not looked upon with such dread as it formerly was. Sero-therapy is undoubtedly the best treatment for post-diphtheritic paralysis.

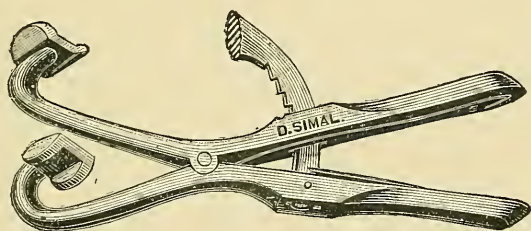


FIG. 10.—O'DWYER'S GAG.

As a result of this sero-therapy, polymorphic or scarlatiniform erythemata, joint affections, circulatory or urinary troubles, have followed, but they are of no consequence. It is, however, well to note, that there are some cases of malignant hypertoxic diphtheria on which the serum does not appear to have any such curative effect. It is possible that in these cases the sero-therapy was used too late.

If respiration is endangered in consequence of the extension of the false membrane to the larynx, intubation should without exception be performed rather than tracheotomy. An experienced assistant should always be in immediate attendance, ready to replace the tube, if ejected through coughing. The tube is introduced by a special instrument guided by the surgeon's index-finger, and is passed into the larynx, the

epiglottis being at the same time raised. The extraction of the tube, which should not remain *in situ* for more than four to five days, is effected by pressure on the thyroid cartilage from below upward, or by means of a special hook.



FIG. 11.—INSTRUMENT FOR INTRODUCING TUBES.

Tracheotomy is recommended in those cases where the patient is at a distance from the doctor, when there is any chance of approaching asphyxia. The opening should be made below the cricoid, so as to avoid consequent stenosis.

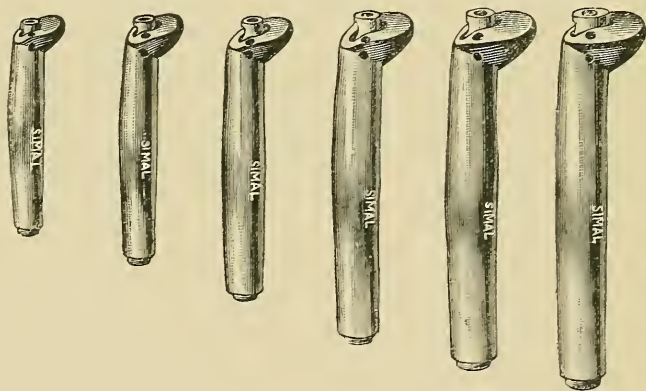


FIG. 12.—O'DWYER'S TUBES.

### Tonsillar and Peritonsillar Abscess.

An acute inflammation terminating in suppuration of, the tonsil, of the cellular tissue around it, or of both simultaneously.

*Etiology.*—Peritonsillar abscesses are more frequent than suppuration in the gland itself. The causes of both are identical. The author has found, that abscess of the tonsil



is most frequent in early life, particularly from eighteen to thirty, thus differing from most authors, who consider it more frequent in youth. It is especially liable to occur at certain changes of the seasons. The size of the tonsil does not appear to affect the development of the disease; on the contrary, the crypts, deep and constricted at their orifices, tend to favour it. Any debilitating cause, such as overwork, excessive fatigue, etc., predisposes to this affection. Although the infection usually comes from without, it is quite probable, as Professor Bouchard has pointed out, that the infection may also be carried from the blood-stream. Cold may act as an exciting cause, either directly or indirectly, through the vasomotor system. Among other causes we have inflammations of the nasal fossæ, especially suppuration of the accessory sinuses and the after-effect of the use of the cautery.

On section a great infiltration of embryonic cells is seen lying in the submucosa of the tonsil and the surrounding tissues. Streptococci, staphylococci, and pneumococci are present.

*Symptoms.*—These vary much in their intensity. The patient complains of slight inconvenience in one side of the throat, followed by pain during deglutition. Accompanying this we have the general phenomena of fever—headache, loss of appetite, with coated tongue, and often accompanied by constipation. If this affection is not arrested at this period the general symptoms increase, with shivering, the voice becoming muffled from the partial or total immobility of the soft palate. Pain is now constant, and may be so severe as to cause the patient to refuse food. The saliva, which is thick and fetid, flows from the mouth, owing to the pain and difficulty of swallowing from the tumefaction. In many cases regurgitation occurs through the nose, and the glands at the angle of the jaw are swollen and painful to the touch, particularly on the affected side.

We may divide these abscesses clinically into two forms—(1) intratonsillar abscess; (2) peritonsillar abscess.



## I. INTRATONSILLAR ABSCESS.

On examination in the earlier stages, the tonsil, along with the mucous membranes covering the anterior pillar and the soft palate, are seen to be congested and slightly swollen. The affected tonsil rapidly becomes larger and of a deeper colour, and frequently a yellowish-white area of suppuration is seen. Fluctuation can sometimes be felt by the finger. If evacuation of the pus does not now take place, it will invade the deep mass of the tonsils, and the peritonsillar

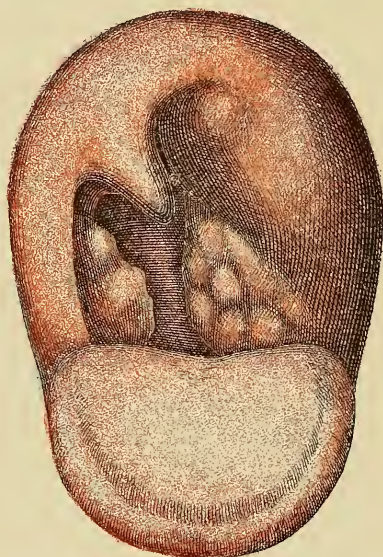


FIG. 13.—APPEARANCE OF THE PHARYNGEAL CAVITY IN A CASE OF AN  
ANTERO-SUPERIOR PERITONSILLAR ABSCESS.

tissue is inflamed in its turn, the tonsils being covered with a whitish coating. The tongue is furred, the jaws are locked, the pain is intense, even shooting up to the ears. Swallowing is so painful, that the saliva is allowed to dribble from the mouth.

## 2. PERITONSILLAR ABSCESS.

**1. Anterior.**—This is the most frequent form of abscess, and is situate in the cellular tissue of the posterior part of

the anterior pillar above the tonsil. At first the redness and swelling are situate over the superior part of the anterior pillar; later the free border of the palate becomes involved and projects forwards, while the tonsil itself is more or less pushed backwards by the swelling.

The diagnosis of this antero-superior abscess is easy, since it bulges at the superior and internal edge of the anterior pillar.

**2. Posterior.**—This form is not so rare as one would at first suppose. At an early stage it may be confused with a retropharyngeal, and later with the antero-superior abscess, with which it blends. At first the congestion and swelling are clearly limited to the posterior pillar, which becomes rounded and smooth, pushing the tonsil in front of it. Later on the palate becomes infiltrated. *The anterior pillar is absolutely healthy.* The tonsil is only slightly congested.

**3. External.**—While the external peritonsillar abscess is less frequent than the preceding forms, it is, however, the more serious. In this form the tissues of the neck are more swollen than in the preceding, with inclination of the head to one side and difficulty of opening the mouth. The general symptoms are of extreme gravity, insomnia and delirium being concomitants. The parotid, submaxillary, and occipital glands become rapidly infiltrated. In a word, the affection appears to be more external than internal. On examination of the pharynx, the tonsils are seen to be projected into the middle line, but are not inflamed. The palate and uvula, with the anterior pillar, may be œdematous, but are often unaffected. On the other hand, there are swelling and congestion inside the tonsillar fossa. The back of the throat is painful to touch, but less so than the external parts. The pus may find its way and escape through the pharyngeal aponeurosis round the vasculo-nervous bundle constituting a lateral pharyngeal phlegmon.

**4. Inferior.**—This abscess is situate below the tonsil, between it and the lingual tonsil, behind the anterior pillar towards its base. By the tonsil its growth is pushed upwards on the anterior pillar. In this form odynphagia is

early and severe. The tongue becomes immobile, and infiltration takes place, not only on the lateral wall of the pharynx, but even extending to the epiglottis and the corresponding aryepiglottic folds. If the pus gravitates laterally, it constitutes a lateral pharyngeal abscess, well known for its exceptional gravity.

The author is of opinion, that pus is found in these cases very early in or round the inflamed tonsil, even forty-eight hours after the first symptoms. Towards the fourth or fifth day the diagnosis can clearly be made out. From this period the disease may be considered under two aspects, according to whether it be treated or left to itself. If treated early the abscess may be cured in from four to six days; whereas if not, it will take from eight to twelve days before evacuation takes place.

*Complications.*—Though always resulting in recovery, complications may arise. Among those we may note œdema of the surrounding parts, and this especially if the abscess be situate inferiorly. Icterus, rheumatism, septic pneumonia, and meningitis also occur, though infrequent. Breton records a case of phlebitis of the internal jugular vein.

Discharge of pus into the larynx may have fatal results by inducing asphyxia before tracheotomy can be performed. Hæmorrhage, arterial or venous, is the most serious accident that can take place. This may occur spontaneously from ulceration into the vessels, or be traumatic during the opening of the abscess.

The *prognosis* is generally benign, apart from those cases where the above-mentioned complications take place.

*Diagnosis.*—There may be some doubt in diagnosing this affection during the early period of congestion, but later on the diagnosis is easy, when we can differentiate whether the tumefaction is in the tonsillar recess or the tonsil itself.

*Treatment.*—At the onset the prevention of abscess formation may be attempted by painting the parts with a solution of chloride of zinc (1 : 15 or 1 : 20) or tincture of iodine. A saline purge, emollient gargles (hot or iced), salol, and the application of hot poultices or ice to the neck may be pre-

scribed. If after the lapse of twenty-four to forty-eight hours improvement does not set in, the author prefers a speedy resort to surgical intervention, but does not approve of the bistoury, for the following reasons: that sometimes severe venous hæmorrhage may follow a slight incision, and that the linear wound produced may close up, and thus form a new suppurating infection, unless kept open daily by the

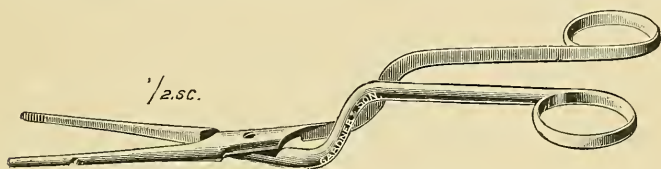


FIG. 14.—ST. CLAIR THOMSON'S PERITONSILLAR DILATOR.

passage of a grooved director. It is only during the later stages, when the abscess is on the point of opening, that the bistoury is satisfactory. The employment of the discission hook with the grooved director (Ruault), or by the method so highly praised by Killian—namely, the replacing of the probe by a forceps introduced into the subtonsillar region—is

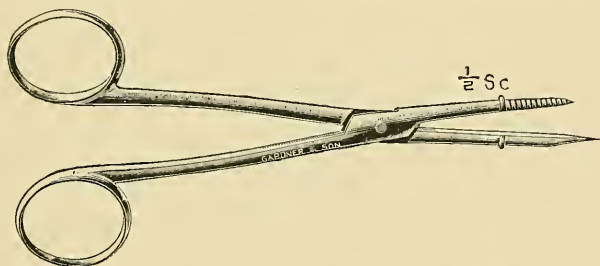


FIG. 15.—FITZGERALD'S PERITONSILLAR DILATOR.

not so efficient in the author's opinion during the early stages. He prefers to use in these cases the thermo- or, better still, the galvano-cautery, at a dull-red heat. The parts are first painted with adrenalin and cocaine (1:5), or with a solution of equal parts of menthol, carbolic acid, and cocaine hydrochlorate (Bonain's solution). The incision made is not very painful; there is little or no bleeding, and as the wound

remains open from eight to ten days, the pus can escape freely, and thus prevent septic retention. In those cases where the aperture has been made early and no pus has been found at the time, it is not uncommon to observe it a few hours later.

In the intratonsillar cases the galvano-cautery is to be plunged into the substance of the organ from before backwards, and the pus evacuated. Where the abscess is situate

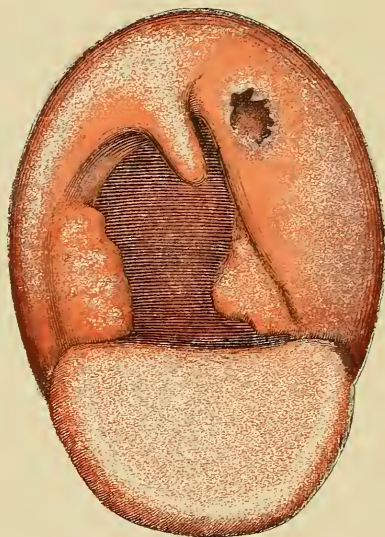


FIG. 16.—APPEARANCE OF THE TONSIL AFTER THE OPENING OF AN ANTERO-SUPERIOR ABSCESS WITH THE GALVANO-CAUTERY.

Site and form of the scar two or three days after the incision. The centre and the edges are slightly more greyish and sphacelated.

antero-superiorly, the incision is to be made over that part of the soft palate which bulges forwards, corresponding to the superior portion of the tonsillar fossa, 1 or 2 centimetres from the edge of the anterior pillar, a spot well indicated by Escat, although not in a direction from before backwards as he states, but from within outwards—*i.e.*, in an oblique direction towards the external wall of the tonsillar fossa. After penetrating the thickness of the palate, which varies from 1 to 2½ centimetres, according to the amount of infiltration,



the peritonsillar cellular tissue is then entered. As a rule, the pus is easily found; if not, the grooved director should be employed, and thrust in various directions without fear of rupturing important vessels. Should hæmorrhage occur it can easily be checked by plugging the cavity with iodoform gauze. If the diagnosis is correct, pus should appear.

When a posterior peritonsillar abscess is dealt with, the incision should be made into the substance of the pillar in a

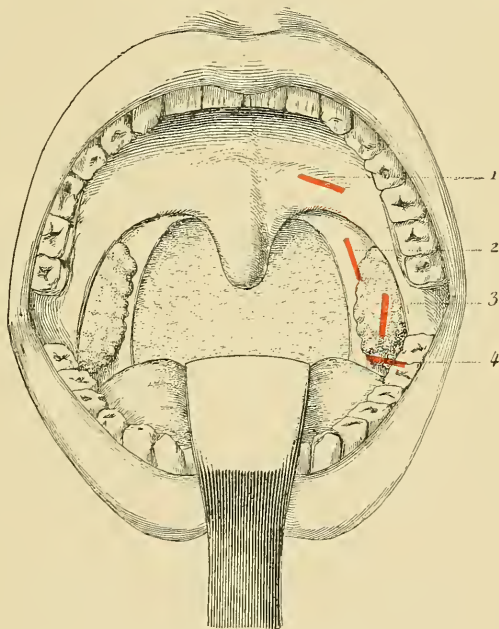


FIG. 17.—APPEARANCE OF THE PHARYNGEAL CAVITY.

The red lines indicate the points of incision : 1, The antero-superior abscesses ; 2, postero-superior (posterior pillar) ; 3, intratonsillar ; 4, antero-inferior. The incision should in all cases be directed from within outwards.

direction from before backwards, and in an oblique direction outwards. The opening should be made almost in the spot corresponding to the upper third of the tonsil. The thickness of intervening tissue is thus less by from  $\frac{1}{2}$  to 1 centimetre.

It is much more difficult to open an external peritonsillar abscess, as the pus is situate on the pharyngeal aponeurosis towards the lateral wall. The infiltration is diffuse, and



owing to the proximity of large vessels, which are nevertheless about 2 centimetres away, the area is dangerous. The cautery knife should be passed through the substance of the tonsil, entering at its superior third, in an oblique direction from before backwards and from *within outwards*. If no pus escapes at a depth of 2 to 3 centimetres, the knife should be withdrawn and the grooved director substituted, and by pushing it in a little below or above the incision pus may be found. If not, it may appear from twelve to twenty-four hours afterwards. The author has seen the abscess evacuated ten to twelve hours after a true hæmorrhage had occurred without causing alarm. In such a case it would have been easy to check the bleeding by stuffing with iodoform or aseptic gauze. Because of their position these abscesses should be opened early. In those cases where the patient cannot open his mouth, or if the incision fails to relieve symptoms, it may be necessary to operate externally.

Finally, if the abscess is situate inferiorly, the cautery should be plunged between the base of the tonsil and the tongue, passing from within outwards through the anterior pillar. It is well to look at the wound twenty-four or forty-eight hours after, and if there is any exudation, etc., to remove this obstacle to drainage by inserting the director.

### Chronic Abscess of the Tonsils.

This may result from repeated inflammatory attacks in the epitonsillar recess, or from the imperfect healing of an abscess there. Between the pillar and the gland there is a cavity, from which pus exudes. As Raoult has pointed out, calculi are sometimes found in the abscess.

*Treatment.*—This consists in opening up the fistulous tract, and swabbing the surface over with a solution of chloride of zinc (1 : 15). A speedy cure is usually obtained in a few days.

### Caseous Lacunar Tonsillitis.

A chronic inflammation of the tonsil, characterized by the presence of caseous masses in the interior of the glands.'

*Etiology.*—Chronic inflammation of these glands, with the special disposition of the crypts, are the causes of this infection.

*Symptoms.*—These are very slight. Some patients complain of inconvenience, or even a pricking sensation in the throat, especially marked during deglutition, and of a slight pain reflected in the direction of the ears. A more characteristic symptom is the expulsion of yellowish-grey, cheesy masses on coughing. These caseous plugs vary much in size, and are extremely fetid. On examination the crypts are seen to be filled with these caseous masses. In some



FIG. 18.—LENNOX BROWNE'S CUTTING HOOK.

cases they can only be seen by displacing the anterior pillar, as they lie behind it in the subtonsillar fossa. Calcareous matter may be deposited, and form a tonsillar stone of various sizes.

*Treatment.*—This consists first, not only in clearing out the crypts, but also in avoiding the reproduction of these foreign bodies. This is done by means of a curved bistoury or special hooks, by which the fibrous septa between the crypts are broken down to form one cavity, which permits of cure. If there should be any tonsillar pseudo-hypertrophy, morcellement should be practised with Ruault's forceps. In those cases where the anterior pillar is so prominent as to hide the affected part of the tonsil, the author is in the habit of incising the anterior pillar on its free edge by the galvano-cautery. The lips of this incision gape so as to form a >, which enables one to get at the diseased crypts.

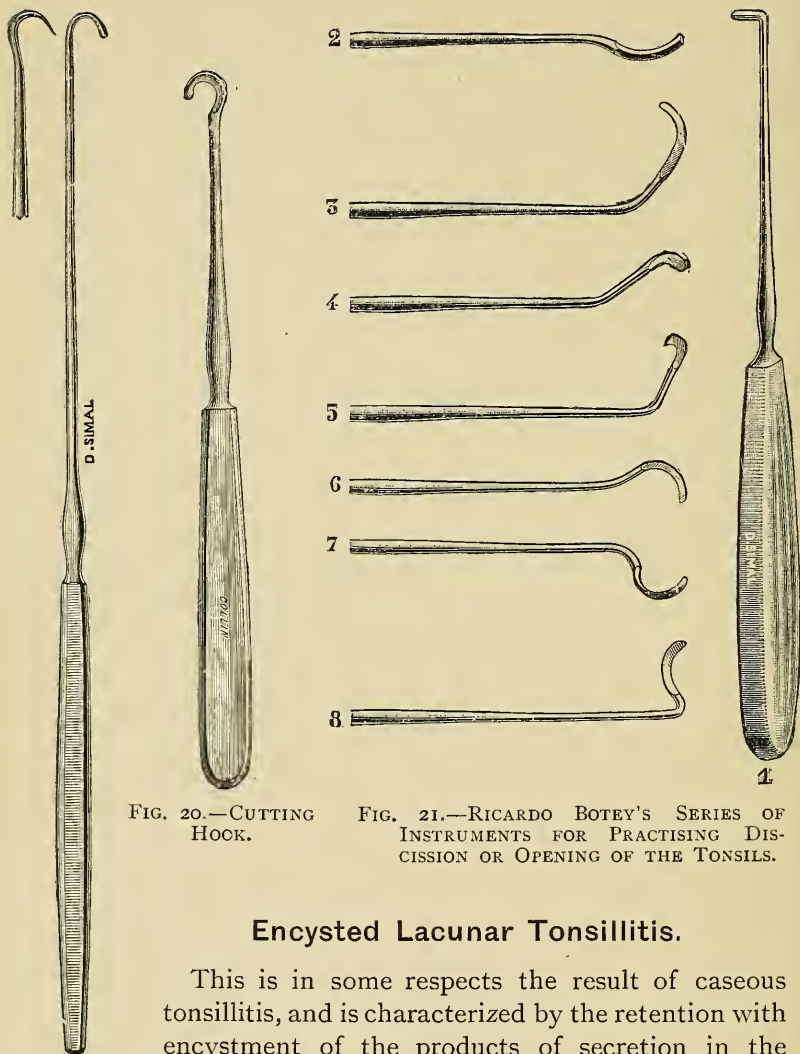


FIG. 20.—CUTTING  
HOOK.

FIG. 21.—RICARDO BOTTEY'S SERIES OF  
INSTRUMENTS FOR PRACTISING DIS-  
SECTION OR OPENING OF THE TONSILS.

### Encysted Lacunar Tonsillitis.

This is in some respects the result of caseous tonsillitis, and is characterized by the retention with encystment of the products of secretion in the tonsillar crypts.

*Etiology.*—This is similar to that of caseous lacunar tonsillitis.

*Symptoms.*—As the result of the occlusion of the duct, a yellowish-white tumour-like mass is produced, varying in size from a gooseberry seed to a small cherry.

FIG. 19.—  
RAULT'S  
SHARP-  
POINTED  
AND CUT-  
TING HOOK.

Hard to the touch, with smooth walls, it resembles very much a fibroma. They are usually situated in the upper part of the tonsil (epitonsillar recess), but they may be met with towards the middle or inferiorly, where they are, as a rule, smaller, probably owing to the constant movement that takes place there. These bodies may be found elsewhere, such as in the lingual and in the naso-pharyngeal tonsil, and were described by Tornwaldt as cysts of the pharyngeal bursa.

*Symptoms.*—These are almost nil. There may be in some cases a prickling sensation, but it is usually on the examination of the throat, that one discovers these yellowish-grey

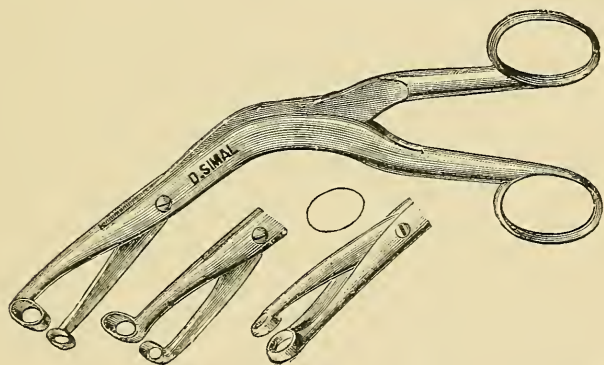


FIG. 22.—PUNCH FORCEPS FOR THE RIGHT SIDE, AND FOR THE RIGHT AND LEFT SIDES.

masses. Those situate at the base of the tongue can only be seen by laryngoscopic examination, or by depressing the organ forcibly. On examination of the contents of these cysts, they are found to consist of epithelial debris and leucocytes. Bacteriologically they give sterile cultures. When infection of these cysts takes place, there are produced those crater-like ulcers which have already been spoken of as ulcerous lacunar tonsillitis.

*Treatment.*—This is simple, and consists of opening the cysts with the galvano-cautery, curetting the cavity, and swabbing over with a solution of chloride of zinc (1:20 to 1:30). A better method is to remove them entirely with

a small pair of Ruault's or Martin's forceps, and then to brush over the surface with the chloride of zinc solution.

### Mycosis.

Mycosis occurs as white clusters, due to the *Leptothrix buccalis*, situate on the surface of the closed follicles of the tonsils, pharynx, lingual tonsils, etc.

*Etiology.*—Though this disease occurs fairly frequently, its pathology is still obscure. Commonly met with in adolescence

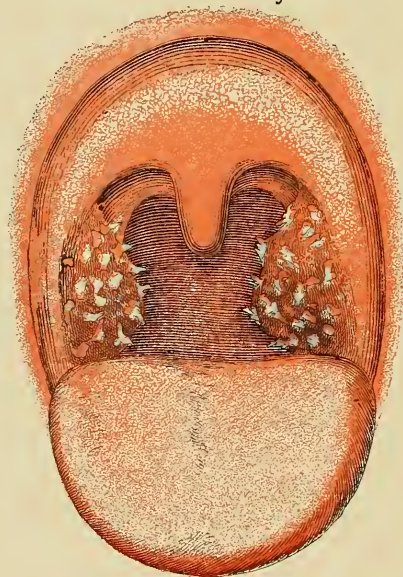


FIG. 23.—APPEARANCE OF THE TONSILS COVERED WITH ISOLATED CLUMPS OF MYCOSIS.

and adult life, the author has seen it in young children from five to eight. The parasitic elements are, however, quite distinct under the microscope after staining with a solution of tincture of iodine.

*Symptoms.*—The symptoms are variable. Sometimes they resemble those of lacunar tonsillitis; at other times only a roughness in the throat is complained of, or they may be almost nil. On examination of the throat the yellowish-white masses arranged in clusters are seen projecting above the



subjacent tissue by 1 or more millimetres. They are very adherent to the mucosa, which is neither red nor inflamed, and they are hard to the touch. Their prominence and whiteness, with the irregular and fringed border, and their intimate connection with the mucous membrane, enable a diagnosis to be made from the caseous secretions or diphtheroid exudates. They are confluent when situated on the tonsil, but are more discrete and prominent on the base of the tongue and on the pharynx. In this disease there is no sign of local or general infection; it is always a chronic condition, and may last for months, and even for years, if left to itself. The author believes that the persistence of mycosis is due to the growth originating at the bottom of the crypts and spreading upwards on to the surface. Unless the forceps entirely remove the crypts and the contained growth, recurrence takes place.

*Treatment.*—The best results in the author's experience have been obtained by epilation with the forceps, and thereafter painting over the surface—first with chloride of zinc (1 : 15) and then with an iodated solution (1 : 5). He also recommends an iodated gargle daily, which facilitates the removal of those superficial clusters that are least adherent. Chromic acid and the galvano-cautery may also be employed if the growth be very persistent. When once the disease is eradicated, it has no tendency to reappear.

### Foreign Bodies of the Tonsils—Calculus.

The tonsils, from their position, and especially on account of their anfractuous disposition, frequently become the receptacle for foreign bodies.

*Etiology.*—Those bodies are usually of a sharp nature, fish-bones, pins, etc., which during the act of swallowing become fixed in the glands. Sometimes the foreign body may have its origin in the substance of the tonsil itself—*e.g.*, a tonsillar calculus, which occurs in subjects who have hypertrophied glands with deep crypts. The composition of a tonsillar calculus is almost the same as that of the analogous salivary



formation. The following is an example of the chemical analysis of a tonsillar calculus :

Calcium carbonate	...	4.10 grammes	4.10 parts
Calcium phosphate	...	66.80	,, 66.80 ,,
Magnesium phosphate	...	4.15	,, 4.15 ,,
Organic matter	...	16.95	,, 16.95 ,,
Water	...	8.70	,, 8.70 ,,

*Symptoms.*—The existence of a foreign body, especially if it be of a sharp nature, is usually shown by more or less irritation or prickling in the throat, with inconvenience in swallowing. On the other hand, in the case of a calculus symptoms may be almost absent. With a good light the foreign body may be frequently recognized on direct examination. In the case of very small fish-bones, deeply sunk in the substance of the gland, a minute examination is sometimes necessary, before their presence is detected. By the aid of the probe or curette a calculus may be disclosed by its hardness and irregularity, and the nature of the foreign body in the crypt thus explained.

*Diagnosis.*—The existence of pain at a fixed point in the throat is an important diagnostic feature.

*Prognosis.*—The prognosis is usually favourable. It should be remembered, however, that these foreign bodies may be the starting-point of secondary infections, such as acute or chronic tonsillitis, etc., and which might not be successfully treated, unless the cause is known and removed.

*Treatment.*—This consists in the removal of the foreign bodies by suitable instruments. In the case of a calculus, the crypt in which it is situate should be opened with the crotchet or curved bistoury, and the offending mass removed. Morcellement is also adopted. Ignipuncture is not advisable, for by creating cicatricial synechiæ it tends to the formation of new calculus growth.

### Tuberculous Angina.

A localized tuberculous infection of the pharynx, either acute (acute miliary tuberculosis) or chronic (œdematous, hypertrophic, lupoid, or latent varieties).

*Etiology.*—The invasion of the pharynx may be primary (lupoid or hypertrophic forms) or, much more commonly, secondary, due to pulmonary disease. With the exception of the lupoid type, it is very unusual to have a tuberculous pharynx without disease in the larynx or lungs. The disease is more frequently seen in adults than in the young or in the aged, and in males more than in females.

#### I. ACUTE MILIARY TUBERCULOSIS.

*Symptoms.*—The most marked symptom is pain, which is always considerable, shooting up to the ears, and specially marked in deglutition. Liquids, such as the saliva, milk, or

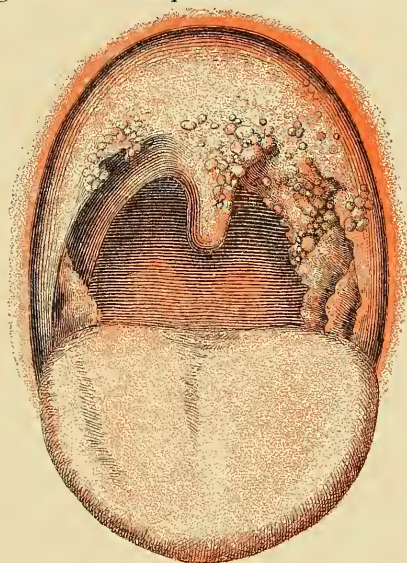


FIG. 24.—ACUTE MILIARY TUBERCULOSIS.

soup, are swallowed with difficulty. Regurgitation of fluids through the nose occasionally takes place through inaction of the soft palate from infiltration. For the same reason the voice becomes altered in tone. The expectoration of mucopurulent secretions which accumulate in the throat is difficult, on account of the extreme pain and the palatal condition.

The adenopathy noted by some authors rarely exists, and

is only of secondary importance. The glands are usually movable, indurated, and are not at all or only slightly painful.

Acute miliary angina shows itself in two forms, ulcerative and vegetative, which are sometimes combined.

(a) **Ulcerative Form.**—The mucosa is altered to a dull grey colour, with a pale miliary infiltration of its substance superficially placed. This breaks down into little cup-shaped

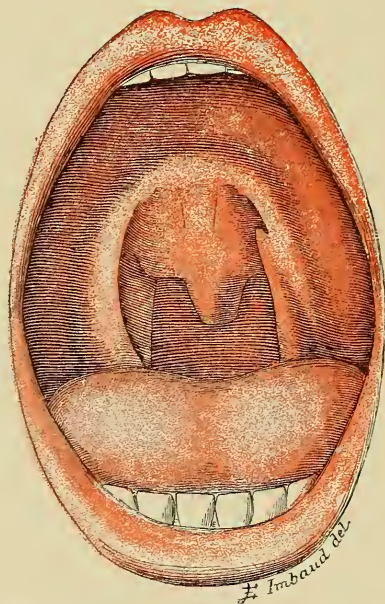


FIG. 25.—TUBERCULOUS ANGINA (ÆDEMATOUS SCLEROTIC FORM).

erosions, surrounded by soft or even œdematous tissue. These coalesce and form ulcers. The base is greyish and the edges are undefined. On the edge of the principal ulcer are small greyish-yellow miliary tubercles, which diminish as they pass outwards into the healthy parts. The ulcers are anfractuouse, with irregular infiltrated edges festooned on the pillars. They are multiple, and are situated generally on the pillars, base of tongue, and tonsils (buccal or lingual). These may unite with similar ulcers situated on the epiglottis

or soft palate. The part most rarely affected is generally the mesial pharyngeal wall. The lesion does not appear to spread beyond the level of the insertion of the posterior pillars. Salivation is abundant, both from the local lesion and from the dysphagia.

(b) **Vegetative Form.**—This is a slower form, almost chronic in its course. Functional symptoms are slightly marked, except pain, which is sufficient to call the attention of the patient to his throat.

The tissues appear shagreened, and covered over by a broad superficial erosion which gradually deepens, leaving a vegetative, even polypiform, surface, showing the appearance of a hypertrophic rather than a destructive lesion. The edges are ill-defined, fading away into the surrounding tissue, where small yellowish-grey miliary tubercles are seen scattered over the pale and discoloured mucous membrane.

These two forms of miliary angina are nearly always accompanied, or rather preceded, by bacillary laryngitis, and habitually with pulmonary phthisis.

The vegetative form would appear to be intermediate between acute ulcerous tuberculosis and the lupoid variety.

## 2. CHRONIC FORMS.

(a) **The Infiltrated Œdematous Type.**—This is a sub-acute or chronic angina, in which infiltration, or sclerema, occurs in the tissues of the uvula, soft palate, epiglottis, and sometimes the posterior pharyngeal wall, and almost always the epiglottis. The affected tissue is of a pale yellowish-grey colour, and hard to the touch. The uvula may feel to the finger like fibro-cartilage.

The author has seen this form of tuberculosis of the throat advance very slowly for several years, and even cure resulting if the treatment was regularly carried out. As a rule, however, we see, especially in the spring and autumn, the development of small acute inflammatory growths on this mucosa. This becomes covered over here and there by small superficial erosions, which are sufficiently painful to inconvenience deglutition, especially when they are on the

epiglottitis or base of the tongue. According as these growths recur, more or less often, we divide these cases into the sub-acute or the chronic.

*Symptoms.*—Nasal speech from the stiffness or immobility of the soft palate. It is rare to have regurgitation of liquids through the nose, because the infiltration of this organ probably protects the naso-pharynx against the penetration of food. There is no pain, or it is only observed on the occurrence of the acute attacks already referred to, and specially during deglutition. The general condition is so well maintained, that one would suspect that this angina is due to some other cause than bacillary disease. In cases which are doubtful one should remove a portion of the tissue for examination.

(b) **Lupus**—*Symptoms.*—Lupus of the pharynx is far from being a rare condition. Sometimes primary, it is much more often secondary to analogous lesions of the skin, nasal fossæ, larynx, or gums. Lupus may follow a purulent pseudo-atrophic coryza—a true bacillary catarrh—in which there is no erosion or ulceration. From the researches of MM. Dubreuille, Meneau, and Frèche, we know that lupus of the skin is in most cases secondary to an identical affection in the nose. However, certain kinds of lupus of the skin are not accompanied by characteristic clinical signs of disease in the nasal fossa. On the other hand, a kind of pseudo-atrophic coryza with yellow crusts, without odour and with a purulent or muco-purulent secretion, is nearly always observed among cutaneous lupous patients. This the author is disposed to consider as a kind of prelupoid bacillary catarrh, susceptible of favouring the development of lupus, not only on the skin, but also on the pharyngeal mucosa. This hypothesis is still very difficult to verify, seeing that with the methods of examination, bacteriological and otherwise, at our disposal, we have been unable to demonstrate in a positive manner the existence of bacilli. The inoculations have nearly all been negative; nor is that to be wondered at, seeing that even in lupous tissue it is not always possible to obtain conclusive inoculations, any more than it is easy to get Koch's bacillus in cut sections of this patho-



logical tissue. It is not exceptional to see lupus of the throat alone. Pain is almost wanting; there is scarcely any inconvenience experienced in deglutition, whether of saliva or of irritating foods. There is sometimes, however, a little burning sensation, with slight dysphagia, and this is usually associated with the formation of acute growths. Frequently, then, in spite of a very pronounced local lesion, the general symptoms are absolutely wanting, as well as the evidence of pulmonic disease.

Lupus attacks by preference the lateral parts of the throat, the pillars, soft palate, tonsils, and base of the tongue. The general colour of the mucosa is not altered. At the beginning of the process small reddish granulations are seen to be studded over an infiltrated, softened, and rosy-coloured mucous membrane. It is sometimes almost impossible to distinguish even under good light and careful examination where the healthy and the diseased tissues meet. These reddish excrescences diminish in size as they spread outwards to the healthy tissue. There is frequently ulceration in the centre of the patch, covered over with a greyish secretion. When the pillars are involved they present a mammillated appearance, resembling a mulberry. This is a pseudo-hypertrophic tuberculosis. By curetting it is easy to see how much these apparently superficial lesions are, on the contrary, deep and destructive. As the disease progresses, whitish cicatricial bands are observed, stretching from above downwards, either on the pharyngeal wall, which they furrow, or on the posterior pillars. Those dull yellowish or greyish cicatrices are covered over from time to time with small, irregular ulcers, which are somewhat painful. It may invade also the base of the tongue, the palatal vault, the epiglottis, and even the whole larynx. Those inflammatory symptoms are more common in spring and autumn, and have been seen to appear regularly during several consecutive years. They leave behind pale nodular scars.

(c) **Hypertrophic Form.**—The author would designate this the pseudo-hypertrophic tonsillar variety, to which Professor Dieulafoy has recently called attention. There

are no local functional symptoms, and it would appear as if we were dealing with a simple tonsillar hypertrophy, until a histological examination is made, when the presence of caseous nuclei, giant cells, and Koch's bacillus is demonstrated. It usually shows itself in children of healthy appearance and of good history. The researches of Dr. Bruedel show that these patients are in no way more predisposed than others to remote tuberculosis, as the nucleus of concealed tuberculosis is surrounded by a zone of sclerosis and becomes healed.

*Course.*—In acute miliary tuberculosis the course is usually rapid, and generally occurs in the last stage of the tubercular affection, precipitating the fatal event.

The vegetative form is subacute in its course.

The chronic œdematous form and the lupoid are much slower, and advance by a series of successive exacerbations.

With well-directed treatment, local and general, healing can be obtained, at least for a time, leaving behind it a series of fibrous cicatrices, which are so extensive as to cause contraction of the naso-pharyngeal orifice.

In the hypertrophic form we are unable to say anything regarding its progress or duration, since it is often only recognized from the histological examination of a tonsil, which has been removed on account of its hypertrophy. It can be understood that, if left alone in young children, it may be the starting-point of local infection, which may become general.

*Prognosis.*—This depends on the degree of the general infection of the individual, and on the form and progress of the disease. The pathology varies in no wise from the disease elsewhere, except in the fact that Koch's bacilli, which are easily demonstrated in the acute forms, are exceptionally rare in the chronic forms.

*Diagnosis.*—Acute miliary tuberculosis cannot be mistaken for any other ulcerous condition. Indeed, the coexistence of pulmonary and laryngeal lesions, the functional disturbances, the appearance of the lesions and of the patient, generally suffice to make a diagnosis. Thrush, aphthæ,

angina with the development of a false membrane, are all distinguished from it by their general symptoms, and specially by their course and duration.

Lupus has to be differentiated from syphilitic ulceration, which bears some resemblance to it. The coexistence of cutaneous, nasal, or analogous buccal lesions is important in establishing a diagnosis. Lupus is essentially chronic, while syphilis shows itself, on the contrary, to be a rapidly destructive lesion. Syphilis attacks by preference the pharyngeal wall, lupus the lateral walls. The syphilitic ulcer is cup-shaped, with projecting, punched-out edges, which are red, anfractuons, and clearly differentiated from the surrounding tissues. The base of the ulcer is greyish, suppurative, serpiginous in form. In lupus, on the other hand, the edges are badly defined, the ulcer more superficial, and covered over with pinkish granulations. They are multiple, sometimes separated from each other by healthy tissue. They are not very painful and are more diffused. Pain, which is almost absent in lupus, is, as a rule, more marked in syphilitic cases. Specific treatment soon clears up the doubtful diagnosis.

When lupus is grafted on a syphilitic patient, then there is great difficulty of diagnosis. Reliance must not be placed on the positive or negative evidence of the history. In many cases the patients will not own to having had syphilis, and if they do, the practitioner is inclined to mark the lesion syphilitic, even though it is a case of a clearly tuberculo-lupus nature. Again, the patient may not know his antecedent history—*e.g.*, in a hereditary case.

With regard to the ulcerative processes in the eruptive fevers, the coexistence or the pre-existence of pyrexia would suggest the diagnosis.

Finally, in cancer of the pharynx we have a true vegetative growth, with indurated edges causing immobility of the affected tissue, followed by the characteristic glandular involvement, with fetor of the breath.

In a doubtful or difficult case the progress of the disease will determine the real nature of the morbid process.

*Treatment.*—In the acute miliary form treatment should be confined to assuaging the painful dysphagia, which is the predominant symptom of the disease. In such a case the methods at our disposal unfortunately fail, neither morphia, cocaine, nor orthoform relieving the intolerable pain. Frequent washings of the pharynx with alkaline solutions are useful (borate or benzoate of soda, antipyrin, etc.).

R Benzoate of soda	...	...	8 grammes	ʒii
Resorcin	...	...	6 „	ʒiss
Antipyrin	...	...	4 „	ʒi
Glycerine	...	...	250 „	ʒvii

A teaspoonful in half a glass of tepid or slightly warm water.

R Carbolic acid	...	60 centigrammes	gr. 9
Hydrochloride of morphine	25 to 50	„	gr. 4 to 8
Hydrochloride of cocaine	50 centigrammes		gr. 8 to 16
		to 1 gramme	
Menthol	...	1 gramme	gr. 15
Glycerine	...	50 grammes	ʒxi
Distilled water	...	450 „	ʒxvi

Dissolve the menthol in a little alcohol and filter the solution, to remove the excess of menthol, which will not dissolve.

The following may be used if the pain is less excessive :

R Antipyrin	}	...	āā 5 grammes	(gr. 78
Bromide of sodium				gr. 78
Hydrochloride of cocaine	...	50 centigrammes		gr. 8
Glycerine	...	50 grammes		ʒxi
Spirit of peppermint ('alcool de menthe')	...	5 „		℥lxxx
Water	...	450 „		ʒxvi

This should be used as a spray three or four times a day when food is taken. The patient should rinse his mouth with an alkaline lotion to prevent any of the anæsthetic fluid getting into the stomach and spoiling an already indifferent appetite.

Painting the throat with the following formula is useful :

R	Biborate of soda ... ..	3 grammes	gr. 45
	Hydrochloride of cocaine ... ..	1 gramme	gr. 15
	Cherry-laurel water } ... ..	āā 15 grammes	{ 5iv
	Glycerine }		{ 5iiss

A solution of menthol in oil (1 : 10), as recommended by Rosenberg, has sometimes a sedative effect. A spray of iodoform in ether is very useful.

After curetting the ulcerated surface the following insufflation will be found very helpful :

R	Orthoform } ... ..	āā 5 grammes	{ gr. 78
	Di-iodoform }		{ gr. 78
	Menthol ... ..	1 gramme	gr. 15

Or still better :

R	Hydrochloride of cocaine	60 centigrammes	gr. 9 to 15
		to 1 gramme	
	Hydrochloride of morphine	10 centigrammes	gr. 1½
	Menthol ... ..	1 gramme	gr. 15
	Iodoform (powder) } ... ..	āā 8 grammes	{ 5ii
	Boric acid (powder) }		{ 5ii

A pinch to be insufflated once or twice a day into the back of the throat.

Such are the formulæ which will help to ameliorate the painful symptoms and assist in healing the ulcers. If a favourable result is obtained, a slight curetting of the ulcerated surface may be practised from time to time with carbolyzed glycerine (from 1 : 10 to 1 : 3), or with lactic acid, which is so highly recommended in tuberculous laryngeal cases by Krause and Hering.

In the lupoid or subacute forms we can only say, that if the treatment is well carried out, a successful issue is almost certain. As soon as diagnosis is made, it is well to scrape away energetically all the diseased tissue, in order to suppress the softer vegetating granulations. The bleeding



surface is then cauterized by a solution of lactic acid (1 : 3), or even the pure acid, by glycerine and carbolic, or by the galvano-cautery lightly applied. This in the form of ignipuncture is an excellent way of obtaining a cicatricial sclerosis.

After cure the patient should be watched, for relapses may occur.

The local treatment of tuberculous infiltrating œdematous angina should consist of emollient or slightly astringent gargles during the sharp onsets. During the chronic sclerematous stage the author prefers ignipuncture applied to the substance of the tissue every fifteen or twenty days. The fine galvanic point should be inserted from 1 to 1½ centimetres, and thus form cicatricial tissue. By this treatment, to which

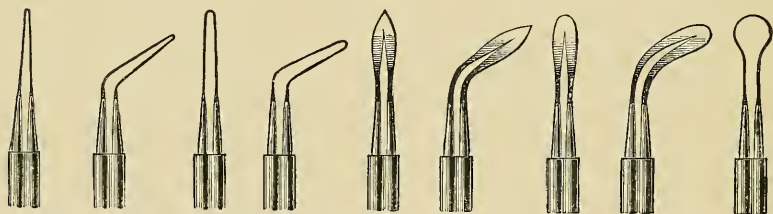


FIG. 26.—VARIOUS CAUTERY POINTS.

may be sometimes added resection of the infiltrated portions, the author has seen the lesion diminish gradually. The patients ought in such cases to be kept under observation for years, for fear of bacillary infection.

The general treatment in acute cases is the air cure, rest, and superabundance of food.

In lupoid or subacute forms general tonics should be given, especially iodine and cod-liver oil if it can be borne. Lupus, once cured, leaves whitish scars; it sometimes produces constrictions of the naso-pharynx, which may be so great as to occlude the naso-pharynx from the pharyngeal cavity. This is of very rare occurrence.

In hybrid tuberculous and syphilitic cases the specific treatment should be employed with care.

## Syphilis of the Pharyngeal Cavity.

Under the term syphilis of the pharyngeal cavity may be included the lesions produced by syphilis during the primary, secondary, and tertiary stages, on the mucous membrane of the pharynx.

### I. CHANCRE.

This is usually situate on the tonsil. The lesion perhaps occurs more frequently than was formerly supposed, and is commonly the result of direct inoculation, as from the nipples of the nurse, infected utensils, and unnatural offences. The presence of acute inflammation of the tonsil predisposes to infection.

The chancre may assume the anginous, erosive, or ulcerous types. These all present common characteristics, such as great swelling of the infected gland, which may be three or four times its ordinary size, stretching into the middle line close to the uvula. The tonsil presents a reddish appearance, hard to the touch but painless. The lymphatic chain is enlarged at the angle of the jaw, one gland being more so than the others. It is unilateral. These glands are painless, movable, hard, and numerous, and that they are swollen may be perceptible to the eye. The skin covering them is normal in colour and movable.

In the anginous form the chancre may begin, like ordinary tonsillitis, with a pultaceous exudation. This may not at first be suspected as a case of syphilitic angina till certain factors are taken into account, such as the long duration of the angina, its unilateral nature, with the characteristic adenopathy.

In the erosive form, in addition to the above symptoms, we see a small membranous diphtheroid exudation on the tonsil, and showing beneath, on removal, fungoid ulceration, which is replaced afterwards by a mucous patch.

Finally, in other cases we see on the tonsil a true crateriform ulceration. The base is grey, pultaceous in appearance, and the edges are hard, red, and irregular. At first sight this might be mistaken for an epithelioma,

or even a gumma, but for the course of the disease—the special glandular involvement and the facies of the patient.

## 2. SECONDARY STAGE.

**Erythema.**—This appears to consist simply in a diffused redness over the entire mucosa. The hyperæmia is more marked over the soft palate, pillars, and tonsils, which latter are usually slightly enlarged. Punctuated red spots, like those seen in scarlet fever, appear, but are much more discrete and without the general phenomena.

**Hypertrophy.**—The tonsils are generally bilaterally affected, and can only be distinguished from simple hypertrophy by their more congested appearance, by the concomitant erythema of the soft palate and pillars, and by the rapid evolution of its progress. This hypertrophy occurs also in the other masses of lymphoid tissue in the neighbourhood, and is so frequently seen that it deserves the special attention of the clinician. The following symptoms should help in making a diagnosis: The presence of diffused hypertrophy rapidly taking place in an individual, who had previously no such enlargement; the characteristic tonsillar voice, this occurring without inflammatory reaction; rapid hypertrophy, accompanied by submaxillary adenopathy, and the duration prolonged beyond the ordinary limits of an inflammatory tonsillitis.

The development of other symptoms, such as roseola, nocturnal headache, falling out of the hair, etc., should clear up the diagnosis.

**Mucous Patches.**—The throat is the favourite situation of the mucous patch in various forms: the erosive, the papulo-eruptive, the papulo-hypertrophic or the ulcerous. The erosive and the papulo-erosive are the most commonly seen. Greyish in colour, they project above the mucous membrane, and are very similar in appearance to the stain caused by the nitrate of silver pencil. They are localized usually over the anterior pillars, the soft palate, the tonsils, and sometimes over the posterior pillars. They do not

occur on the pharyngeal wall proper. They are not infrequently observed on the lingual tonsil. Their form is very variable—sometimes round or elongated; at other times they are almost confluent, with irregular margins. The edges are red and sharply defined. In very slight cases there is frequently found on the clear border of the anterior pillar a small greyish streak with a carmine-coloured border, usually bilateral, though sometimes more pronounced on the one side than the other. The persistent duration of the

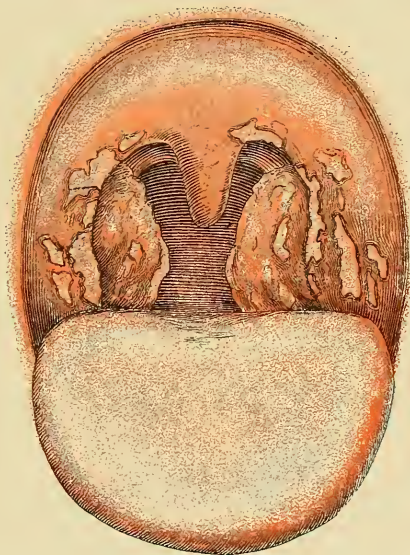


FIG. 27.—MUCOUS PATCHES OF THE PALATE, ANTERIOR PILLARS, AND TONSILS.

lesion in this locality should suggest the possibility of syphilis, and the necessity of looking out for other signs to strengthen the diagnosis.

The secondary angina may commence like an acute angina, and is known as the diphtheroid form. In these cases the tonsils and pillars are covered over at first with small whitish patches, which disappear, but the angina remains beyond the limit of an acute condition. On careful examination, mucous patches are frequently found scattered over the

mucosa of the cheek, lips, lingual tonsil, etc. The roseolar cutaneous rash usually follows very soon after this lesion.

The ulcerous form is very frequently seen among smokers. In the same way the papulo-hypertrophic patches—true condylomata—are observed in subjects who have been deeply infected, but whose treatment, through negligence or errors of diagnosis, has been delayed. The author has seen them invade all the pharynx, extending to the bony palate, and resembling the analogous lesions seen on the genital mucosa.

The symptoms are, as a rule, not well marked. Some inconvenience in swallowing may be complained of and cause the sufferer to seek advice.

In some of the diffuse ulcerous forms pain may be present, even shooting up to the ears during deglutition. The secondary symptoms may last for some months, and may even recur during the first or second year. Those persistent cases are usually seen in smokers, and the lesion may not heal unless the habit is given up.

As regards the long duration of a syphilitic angina, Dr. Garel of Lyons states that any angina which is prolonged beyond twelve or fifteen days should be considered suspicious.

### 3. TERTIARY STAGE.

Before the development of this stage there is a form of secundo-tertiary ulceration which succeeds the mucous patches. These lesions are deeper than those of the secondary period, and are localized usually on the edge of the uvula and anterior pillar. They are met with in smokers, in the non-treated cases, and where the infection has been severe.

It is usual to distinguish two kinds of tertiary lesions in the throat—the gummatous and the ulcerative. The author thinks, however, it is more logical to consider the ulceration as a result of the gumma. It is rare to see a patient in the gummatous stage, as it is nearly always during the period of ulceration that advice is sought.

The gumma has a reddish smooth surface, more or less



localized, and is hard to the touch. After a certain period it begins to soften, when little crater-like excavations are formed, with distinct anfractuous punched-out borders. These tertiary ulcers are situated on the posterior and lateral wall of the pharynx, are serpiginous in form, and extend from the naso-pharynx to the entrance of the œsophagus. They also occur on the soft palate (on both the anterior and posterior surface), the posterior pillars, and at the lower border of the tonsil at its junction with the tongue. The loss of tissue may be very great, the larger

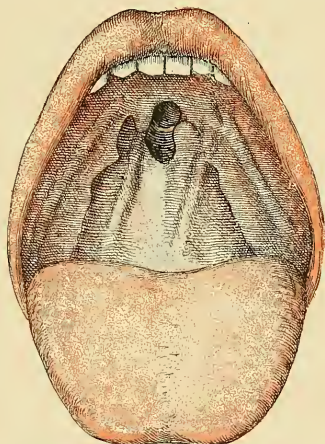


FIG. 28.—TERTIARY SYPHILIS OF THE PHARYNGEAL CAVITY AND OF THE PHARYNX.

part of the pharynx being transformed into one large excavation, with a grey sloughy base. It looks as if the tissue had been punched out. When the soft palate is attacked, great destruction often results. The tissues are very red, infiltrated, and well defined. At the junction of the hard and soft palate, a broken-down gumma, which has penetrated through the osseous tissue into the nose, is frequently seen. These osseous gummata are also very common in the mesial line and behind the dental arch. They may occur on the pharyngeal wall, sometimes causing necrosis, when death may suddenly result from hæmorrhage.

*Diagnosis.*—The diagnosis of a tonsillar chancre may be somewhat difficult, since it may commence like an acute angina. It is especially from the characteristic glandular involvement, the general infection of the subject, the progress of the disease, and particularly the early appearance of other secondary symptoms, that diagnosis may be determined. However, in doubtful cases the long duration of the lesion, and, speaking generally, its slow and comparatively painless progress, should arouse suspicion.

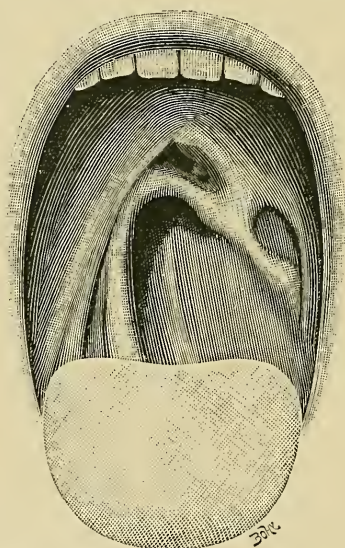


FIG. 29.—TERTIARY SYPHILIS OF THE PHARYNGEAL CAVITY.

The secondary symptoms are distinguished by their appearance, and by the persistence of the angina beyond the usual time.

Reference has already been made to the gumma in connection with tuberculosis.

*Course.*—The chancre usually heals without any treatment. The secondary, no doubt, may also disappear; but if specific treatment is not adopted to check its progress, the patient may be caused considerable inconvenience. Slight secondary symptoms appearing in a subject who is careful in his personal

habits unfortunately disappear without being treated, leaving the patient exposed to the tertiary lesions; for cases where early treatment has been omitted are those affected with gummata and their sequelæ.

Tertiary lesions, on the other hand, if left to themselves, have no tendency to heal, and they produce great destruction, as we have seen. When once a bony tissue is necrosed, specific treatment fails. The peripheral parts of the mucosa heal under treatment, but until the sequestrum is removed cicatrization will not take place. Cicatricial tissue may be very pronounced—so much, indeed, that extensive strictures, either in the naso-pharynx or at the laryngeal entrance, take place.

Treatment is the same in all stages—the exhibition of specifics. For his part, when he wishes to heal any of the lesions, even in the secondary stage, the author does not hesitate to give the biniodide, as in the following :

R	Biniodide of mercury	15 to 20 centigrammes	gr. $2\frac{1}{2}$ to 3
	Iodide of potassium	15 to 20 grammes	ʒiv to v
	Water ...	... 300 grammes	ʒxx

A tablespoonful morning and evening in a little water at meals.

It has very seldom been necessary, even in the case of very pronounced lesions, to exceed 20 grammes of iodide of potassium, if the treatment was regularly carried out.

Even in very grave forms of syphilis the author has noticed that in forty-eight hours or three days the patient experienced considerable relief, which could not always be explained by examination, and after a week to ten days the improvement could be readily seen.

When the lesions have disappeared or diminished, but are still in the secondary stage, he prescribes the following pills :

R	Protoiodide of mercury	25 milligrammes	gr. $\frac{3}{8}$
	Extract of opium	... 1 centigramme	gr. $\frac{1}{6}$
	Extract of cinchona	... 2 centigrammes	gr. $\frac{1}{3}$

Two to three, or even four, pills to be taken daily, one or

two compressed chlorate of potash lozenges being allowed to melt in the mouth at the same time.

This treatment is to be continued, with intervals of rest, according to the toleration and degree of infection of each patient. Mercury may be given with care subcutaneously. It is indicated in cases where the digestive tract is troublesome. In the tertiary stage the author prefers to use the mixed treatment, as it gives better results.

*Locally.*—In the second stage, undoubtedly the best treatment is to paint the ulcerated part with a strong solution of iodine (1 : 3 or 1 : 5), twice a week. If the lesions are obstinate and very diffused he uses a solution of nitrate of mercury (1 : 5). With the latter the painting should only take place once every eight or ten days. In addition, an iodine gargle is given, as follows :

R Iodine	...	...	30 centigrammes	gr. 5
Iodide of potassium	...	...	50	gr. 7½
Laudanum (Sydenham's)	...	...	3 grammes	℥ xlv
Pure glycerine	...	...	150	ʒiv

A teaspoonful to a half or whole glass of tepid water used as a gargle after each meal.

In the treatment of tertiary ulcers cleanliness must be enforced, using the iodine solution, or other antiseptic, such as oxygenated water (1 : 5), etc.

### Hypertrophy of the Tonsils.

Chronic inflammation of the tonsils, with permanent increase of tissue.

*Etiology.*—This is specially frequent during childhood. Any nasal obstruction, such as adenoid vegetations, turbinal hypertrophy, septal spurs, etc., which produces mouth-breathing is an important cause of inflammation and consequent hypertrophy. Repeated acute inflammatory attacks also favour this condition, as well as certain general infectious diseases, such as measles, scarlet fever, influenza, diphtheria, typhoid, etc.

There are two forms: a true hypertrophy and a pseudo-hypertrophy—the former produced by an increase of all the elements of the tonsil, while the latter is due to obstruction of the crypts from retained secretion. The symptomatology has been much modified, since we know the symptoms caused by the presence of adenoid vegetations. The modification of the vocal tone, known as the tonsillar voice, is attributed to the hypertrophied organs interfering with the proper function of the soft palate.

We may divide the hypertrophies into three varieties—(1) the pedunculated, (2) the hooded, (3) the multilobular.

The pedunculated project beyond the pillars. In the hooded variety, although they may be much enlarged, they appear blended with the anterior pillar, so that it is often difficult to know where the one begins and the other ends.

In the multilobular it is usual to find one of the lobes stretching towards the base of the tongue and almost touching the epiglottis. The glands at the angle of the jaw may be enlarged, and also the adenoid tissue in the throat.

*Complications.*—This hypertrophy predisposes to infectious tonsillitis and suppurative inflammations. Among the complications may be noted some reflex symptoms, such as spasmodic coughing, œsophagismus, glottic spasm, asthma, etc.

*Diagnosis.*—This hypertrophy is easily seen on depressing the tongue. It has to be differentiated from the secondary hypertrophies of syphilis by the history of the case, presence of other lesions, etc. Again, in examining children one must distinguish the conditions, where the tonsils are simply pushed forward by an excessive straining, by getting the patient to breathe freely, and by properly placing the spatula on the tongue behind the inferior dental arch.

Lymphadenoma is usually recognized by the accompanying swelling of the parotid glands. Its excessive development is besides unilateral. The course of the affection and histological examination of a portion of the tissue make diagnosis sure.

*Treatment: (a) Medical.*—If the glands by their bulk inconvenience the patient, or become the seat of repeated



inflammations due to the crypts and the microbic products that they contain, medical treatment either fails or has a transitory effect.

Astringent gargles are recommended, preferably those containing iodine, with accompanying applications of pure citron-juice or resorcin (1 : 10), which will have the effect of promptly cleaning the gland, and in some cases reducing its bulk. Adrenaline in solution (1 : 10,000 or 1 : 5,000) will

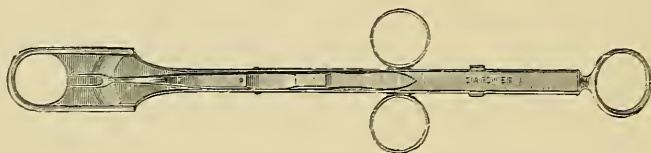


FIG. 30.—BEHAG'S TONSILLOTOME.\*

produce excellent results in such cases. Certain mineral waters (sulphurous, arsenical, or even saline) act favourably on the hypertrophied tonsils. Sprays, gargles, throat-washes, or even aquapuncture may be used. The latter consists in directing a very fine jet of water with sufficient pressure to produce a veritable traumatism on the part of the tonsil implicated. The inflammatory reaction may clear the tonsillar crypts, and in some cases reduce the bulk of the glands themselves. It goes without saying, that medical treatment



FIG. 31.—FANHESTOCK'S TONSILLOTOME.

will be more applicable to pseudo-hypertrophic forms, caseous tonsillitis, chronic tonsillitis, etc., than to true hypertrophy. In the latter it will be preferable to reduce or suppress the hypertrophied parts, as follows :

(b) *Surgical*.—Some time ago the tonsillotome was systematically used, but of recent years, owing to hæmorrhage and other accidents, different means have been employed, such as ignipuncture, the snare (cold or hot), or morcellement.

\* Guillotine used by the translator. Edinburgh Royal Infirmary pattern.

The galvanic snare necessitates an elaborate electric installation, and can be employed only where the tonsil is pedunculated, or when the organ projects sufficiently to enable the wire to encompass it. The steel wire should only be at a dull-red heat, to prevent hæmorrhage, as well as the

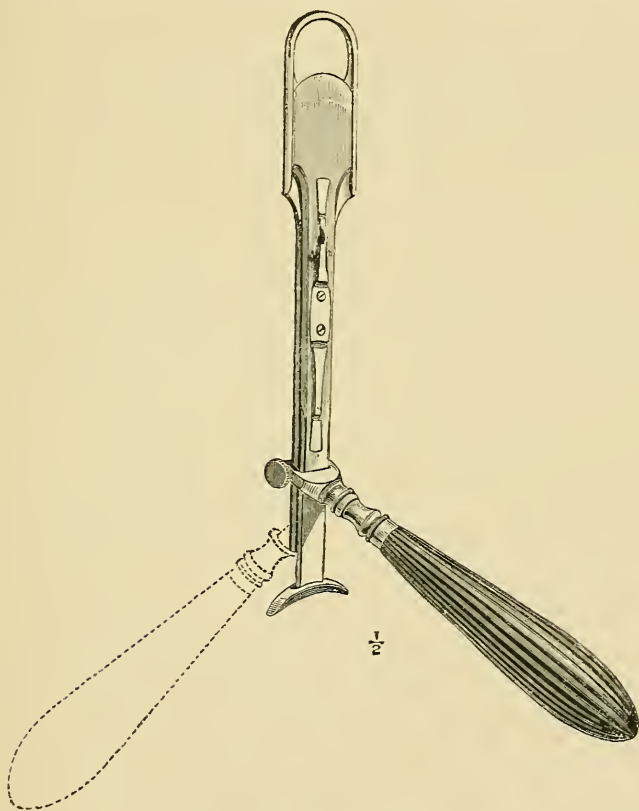


FIG. 32.—MORELL-MACKENZIE'S TONSILLOTOME.

melting of the wire. The cold wire should be placed over the tonsil, tightened, and then the current passed through. This should be done interruptedly, not to overheat the wire, and so keep it at a dull-red heat. Thus the section is done by degrees, and is finished in a few seconds. In more difficult cases it may be necessary to get an experienced assistant

to draw the tonsil out so as to enable it to be encompassed with the snare.

Ignipuncture by the galvano or thermo-cautery requires the patient to be very tractable, and necessitates the use of a gag combined with a tongue spatula, to avoid burning

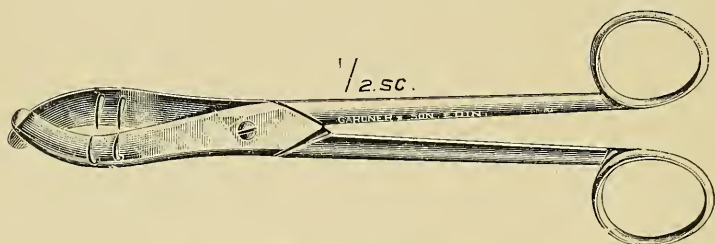


FIG. 33.—ERICHSEN'S TONSIL SCISSORS.

the neighbouring structures. This procedure gives rise to serious inconvenience if it be performed timidly—that is to say, by the aid of small, deep ignipunctures plunged into the tonsil, which may need six, seven, and even eight sittings. It is also the means of creating synechiæ, which obstruct or constrict the crypts.

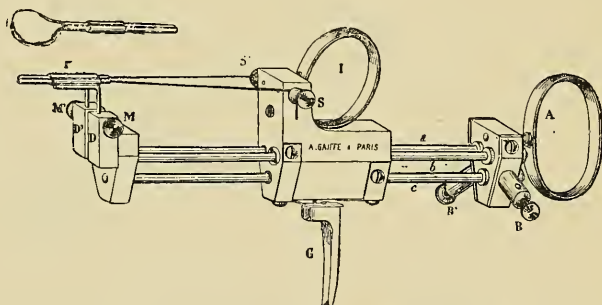


FIG. 34.—GALVANIC CAUTERY HANDLE.

After having favoured this procedure, the author has now almost altogether given it up for the above reasons. He now employs a broad knife (galvano or thermo), and plunges it from within outwards, making three transverse lines, thoroughly cauterizing the tonsil at one sitting. At the next sitting the irregular surface can be levelled down.

*Morcellement*.—This consists in reducing the tonsil piece by piece with special forceps. It is simple, and can be used equally well in children or adults, and only needs one sitting.

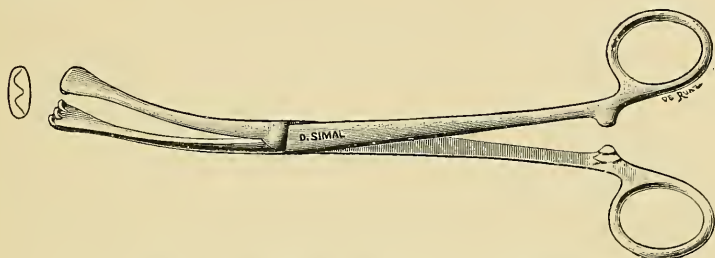


FIG. 35.—DR. BONAIN'S TONSILLAR FORCEPS.

The tonsil is first cocainized, and the tongue being firmly pressed down on the floor of the mouth, the forceps is introduced and pieces removed. It is well to close the blades

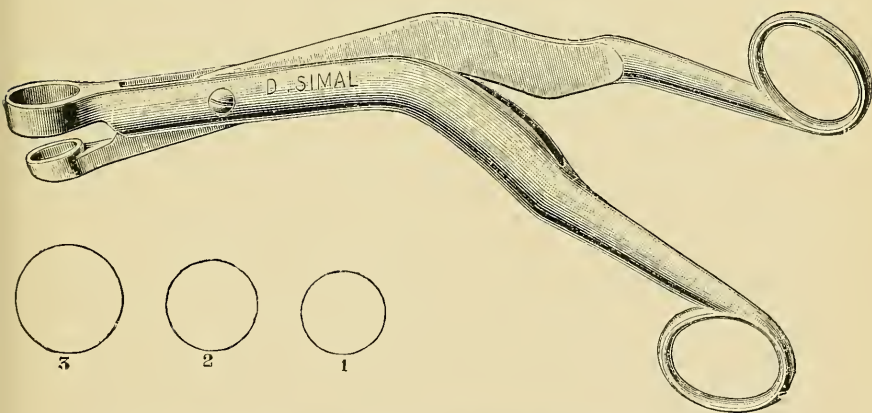


FIG. 36.—RUAULT'S PUNCH-FORCEPS FOR MORCELLEMENT OF THE TONSILS, AND EVEN CERTAIN TUMOURS OF THE PHARYNGEAL CAVITY.

sharply, so that the tissue may be crushed during the act of cutting.

It is important to observe, before tonsillotomy is performed, that the organs are not, and have not recently been,

inflamed. For a few days before the operation the author paints the tonsil with citron-juice, or with the following:

R Hydrochloride of cocaine	30 centigrammes	gr. 5
Resorcin ... ..	4 grammes	gr. 60
Spirit of peppermint ('alcool de menthe') or tincture of eucalyptus ... ..	25 drops	℥ xxv
Glycerine ... ..	30 „	℥ xxx

After the operation is completed, the sucking of ice is beneficial. A cold gargle should be prescribed and used for

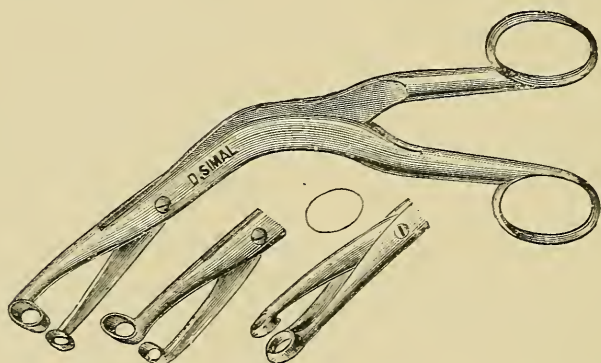


FIG. 37.—PUNCH-FORCEPS FOR THE RIGHT SIDE, AND FOR THE RIGHT AND LEFT SIDES.

twenty-four to forty-eight hours, and if necessary ice may be put into it should there be any fear of immediate or secondary hæmorrhage. The alkaline gargle is the best for disinfection of the throat.

In the case of adolescents and adults the author usually removes only one tonsil at a time, allowing an interval of from eight to fifteen days between each operation. Thus should hæmorrhage or other complication arise, it can be dealt with more easily. If adenoid vegetations be also present, he removes them before performing tonsillotomy, as the latter is often unnecessary after nasal breathing is established. It is, however, possible to remove both the adenoids and the tonsils



at one sitting ; but if the tonsils are very large, it is better to remove them first.

For children any one of these three methods may be adopted :

1. The tonsillotome—an excellent method.
2. The galvanic snare.
3. Morcellement.

For adolescents and adults the two last methods are recommended on account of possible hæmorrhage.

*Post - Operative Complications.* — Hæmorrhage may be formidable after this operation. Fortunately, the bleeding usually comes from a large vessel—arterial or venous—which can be readily seen by good illumination. A plug of cotton-wool soaked in cocaine (1 : 10), with adrenaline (1 : 1,000), equal parts, or pressure forceps on the spot, will usually stop the bleeding. Where possible, a ligature may be applied over the forceps.

Sometimes the bleeding arises from a more extended area, and the above measures fail, as well as the application of iced water, oxygenated water, perchloride of iron, antipyrin, etc. If the flow cannot be checked by the thermo or galvano cautery, Escat and others recommend ligature of the pillars by silk sutures, thus enclosing the tonsil and compressing the bleeding-point.

Another complication is the burning of the neighbouring tissues by allowing the instrument to incandesce too long in the mouth, which may set up cicatricial contractions in the soft palate. Acute infectious angina, or even abscess, may also occur.

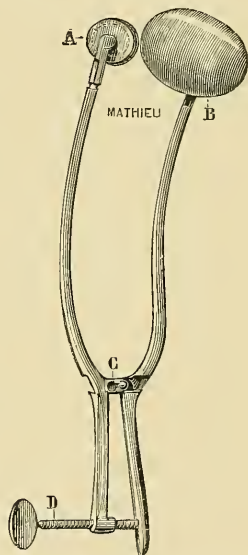


FIG. 38.—BROCA'S TONSILLAR COMPRESSOR.

- A, Tampon for placing on the cut tonsil ;  
 B, external tampon ;  
 C, jointed portion ;  
 D, screw for approximating the pads and producing the compression.

## Tumours of the Tonsils.

These may be divided into benign, malignant, or mixed.

The benign tumours include pseudo-polypoidal hypertrophy, fibromata, papillomata, and cysts.

The malignant growths are the sarcomata (lymphadenomata and lympho-sarcomata), scirrhus, encephaloid and epitheliomata.

### BENIGN TUMOURS.

*Symptoms.*—As a rule, the symptoms are very variable. There may be none, and the tumour is only discovered by chance during the examination of the throat. If the tumour is large or pedunculated, it may give rise to the feeling of a foreign body in the throat, or a prickling sensation, which causes the patient to clear his throat and “hem,” a symptom formerly attributed solely to granular pharyngitis.

In other cases spasmodic coughing occurs, owing to titillation of the base of the tongue or of the epiglottis by the growth.

If the latter is very large, disturbances in deglutition and respiration may occur, with alteration of the voice; but the hearing is generally intact, unless the growth is high up on the pharyngeal wall.

### OBJECTIVE SYMPTOMS.

**1. Pseudo-polypoidal Hypertrophy.**—Where one of the lobes of the tonsil has become prominent and suggests a true polypus, microscopic examination shows the normal histology. This hypertrophy may be unilobular or multi-lobular.

**2. Papilloma.**—This is the most frequent growth, and is usually situate on the edge of the soft palate, the anterior pillar, or on the tonsil itself. Usually pedunculated, it has a mulberry-like appearance, is made up of small warty processes, is of a rosy-grey colour, and varies in size from a grain of corn to a hazel-nut.

**3. Fibroma.**—This may be pedunculated or sessile, and is usually attached to the mucosa by a broad base. It has a pale pink or yellowish colour, and has usually a rounded or oval form. It is hard in consistence. On its surface ecchymosis may sometimes be observed.

**4. Adenoma.**—Like a cyst, this is a smooth tumour with an even surface, greyish, or of a rosy-grey colour, and resembling somewhat a mucous polypus. It is very rare, and diagnosis can only be made by histological examination.

**5. Cysts.**—Retention cysts may contain either serous products or more commonly a syrupy, colloid, yellowish liquid, reddish or prune-coloured if hæmorrhagic. Generally they are not true cysts, since they have no proper wall, but are simply formed through the obstruction and dilatation of the crypts.

At first sight they resemble fibromata in appearance and in hardness, but on being seized with the forceps they burst.

Echinococcus cysts may invade the tonsils. They are very rare.

*Course.*—Usually the progress of benign tumours is very slow. They have no tendency to spontaneous recovery, with the exception of retention cysts, which may become inflamed and burst, and then constitute an acute ulcerous lacunar tonsillitis. If the walls are very thin, their rupture may be brought about by coughing, vomiting, etc.

The other tumours progress gradually and slowly, and sometimes attain a large size if they are not attended to.

*Prognosis.*—Good. If danger supervenes from their size, they can be removed.

*Treatment.*—This consists in removing the growth by the snare, cautery knife, scissors or Ruault's morcellement forceps.

The hæmorrhage is not free, and is easy to stop with the thermo or galvano cautery, or with the strong-pressure forceps applied to the bleeding spot. In the case of retention or hydatid cysts, the galvano-cautery is followed by curetting and the application of zinc chloride (1 : 10).

## MALIGNANT TUMOURS.

The author speaks here only of the primary tumours of the pharyngeal cavity.

*Etiology.*—The causes of these tumours are as obscure as the etiology of such forms in general. They appear to be more common in men, and tobacco, or rather the abuse of it, seems to have an influence on subjects predisposed to this malady. On the other hand, the author does not think alcohol has the same serious determinant effect.

Heredity must play an important rôle in the etiology, but this malignant degeneration is seen in patients having no hereditary antecedents.

*Symptoms.*—At first these may be so slight as to escape observation, such as slight inconvenience in deglutition, a prickly sensation in the throat, with some salivation. After a time the dysphagia increases, and the patient complains of pain, increased by the movements of deglutition and mastication. He feels a continual desire to cough or hawk, which causes him to expectorate saliva or even streaks of blood, and makes him sick. The glands at the angle of the jaw become involved. They vary much in size, but one is larger than the others. They are of cartilaginous hardness, adherent to the underlying structures, and painful to the touch. The voice becomes muffled and tonsillar, and the saliva so profuse, that the patient has either to spit or swallow it.

On account of the immobility of the structures this act is very painful. The breath is now very fetid from the sphacelating neoplasm.

Among certain cancerous subjects there are very few functional symptoms observed, the adenopathy only showing itself late in the disease.

**Sarcoma.**—This is usually seen as a fairly hard unilateral tumour. The mucous membrane covering it is generally dark grey in colour, filling up more or less the naso-pharynx, and especially the buccal orifice.

**Lymphadenoma or Lympho-sarcoma** (for these two tumours are not easily distinguished histologically) is usually met with in adults from thirty to forty years old. Though painless, it interferes with deglutition and respiration. It attacks one or even both tonsils simultaneously, without invading the pillars or the base of the tongue. These tumours may reach a good size before they ulcerate. The submaxillary and cervical glands become involved at an early date, and may extend as far downward as the clavicle. They are of considerable size, distinct from each other, and painful to touch. This condition has been frequently mistaken for chronic unilateral hypertrophy of the tonsils, and surgical intervention has given rise to errors, in the sense that if the tumour did not recur *in situ*, the glands were the seat of secondary growths. The general condition, then, is rapidly aggravated. This adenopathy appears to the author to be the principal symptom for making a correct diagnosis. The glandular enlargement may be extreme, especially when the ulcerated and fungous tumours spread to the nasopharynx, or to the base of the tongue or soft palate.

**Epithelioma.**—The scirrhus variety is exceptional in the throat. Common epithelioma is fairly frequent. It starts in an indistinct manner in the tonsil, uvula, soft palate, or lingual tonsil. The symptoms are those of malignant tumours of the tonsil in general, but differ from sarcoma in that the saliva is blood-stained or sanious from the first, and the pain is also more severe, neuralgic in character, radiating up the head, and especially to the ear. These pains are aroused by movements of deglutition and mastication.

On examination of the throat a reddish tumour is seen, which at an early date is mulberry-shaped, but later develops into a mushroom-shaped structure, the head of which is mammillated, like that of a cauliflower. This is covered over in places with a diphtheroid exudate. There exists later, superficial ulceration, with hard, irregular but not discoloured borders.

The course of the disease is generally progressive, spread-



ing from the tonsil and necessarily involving the pillars, base of the tongue, etc. It may, however, remain stationary for several months. It is only during the ulcerative period that it rapidly invades the neighbouring parts. Adenopathy frequently very early, is extensive, and the other side may be also affected.

*Course.*—At first this is slow, but assumes an acute form from time to time, and carries off the patient in a few months. Its duration is usually from a year to eighteen months. With older subjects it may be rather longer. Death supervenes from cachexia, hæmorrhage, or suffocation.

*Diagnosis.*—This is at first difficult to diagnose from a chancre or gumma. The course of the syphilitic lesion is more rapid; treatment, however, will remove all doubt. As many cancerous subjects were formerly syphilitics, it is important to know that specific treatment has a semblance of favourable effect on the course of the disease even in the case of malignant tumours; but if the treatment with biniodide is prolonged, it seems to cause the disease to advance at a more rapid rate.

There are a few cases where it may be very difficult to make a correct diagnosis. The existence of deep serpiginous ulceration, with pronounced but not hard edges, would favour syphilitic origin, while a vegetative growth, composed of small mammillated projections of reddish colour, bleeding readily on being touched, would be in favour of a neoplasm. The principal points in regard to malignancy, in the author's opinion, are *spontaneous pain, blood-stained expectoration, with the early and characteristic adenopathy.*

*Treatment.*—When seen early the tumour, if on the uvula or soft palate, may be removed. A cure may be effected by means of the galvano or thermo cautery. If, however, the growth has its origin on the tonsil, base of the tongue, or the pillars, it is quite another matter. It is rare that we do not get a recurrence after operative measures on those parts.

An early and strictly localized epithelioma or sarcoma of the tonsils may, if no glandular involvement has taken place, be wholly removed, and a cure take place; but if the neoplasm

has invaded all one side of the throat and is not limited, operation is useless.

If an operation be decided on, the external carotid must be ligatured and the inferior maxilla resected in order to get at the diseased parts. Tracheotomy is not indispensable, but the operator must be prepared for it if necessary. Unfortunately, a cure is very rare after such operative measures.

Some attempt may be made to retard the progress of the neoplasm in cases where an operation is impossible. A gargle or paint of thuja or celandine is of advantage, as for example :

Rx	Solution of adrenaline (1 : 1,000)	} āā 5 grammes	{ m lxxv
	Extract of thuja ... ..		
	Tincture of celandine ... ..		
	Pure glycerine ... ..		
		āā 30 „	{ gr. 75
			{ 3i
			{ 3vii

A teaspoonful to be added to half a glass of tepid water, and used as a gargle several times daily.

This retards the growth, and so helps to diminish the difficulty of deglutition and respiration.

Interstitial injections of the cacodylate or arseniate of soda are also employed with similar effect.

In confirmed cases measures calculated to sustain strength and assuage pain should be employed ; but, after all, radio-therapy gives the best results.

## CHAPTER III

### PATHOLOGY OF THE LINGUAL TONSIL

#### **Acute Inflammation (Folliculitis) of the Lingual Tonsil.**

AN affection limited to the follicles at the base of the tongue. This is more frequent in adults, and is often unobserved through superficial examination, although it may assume in certain cases great severity.

The distinguishing feature of this lingual inflammation is pain elicited by pressure on the sides of the neck, and shooting towards the great cornu of the hyoid. Respiration and phonation are rendered difficult and painful from pressure of the operculum on the laryngeal aperture.

The existence of the lesion, the swelling of the parts affected, and the distinct pultaceous coating of some of the follicles, can be discovered only by the use of the laryngeal mirror.

*Treatment.*—This is the same as that of an ordinary tonsillitis, but it is necessary to see that the patient should in gargling throw his head well backwards, so that the parts are reached by the fluid. This may also be accomplished by the patient saying ‘Gloo’ whilst gargling.

#### **Abscess of the Lingual Tonsil.**

The etiology is just the same as that of all phlegmonous anginæ, but possible erosions of the mucosa by foreign bodies or sudden infections due to the galvano-cautery must be borne in mind.

*Symptoms.*—Odynphagia and dysphagia, corresponding to the size of the abscess, with pain radiating up to the ear on

the affected side. Besides these, we have the usual symptoms of shivering, headache, etc., common to phlegmonous angina. The voice and articulation become thick from the infiltration and immobility of the base of the tongue. Respiration may not be affected, or only slightly so; but if the lesion is pronounced, respiratory dyspnoea may result; and if œdema of the epiglottis or of the folds takes place, tracheotomy may be necessary to ward off asphyxia.

Locally very little beyond a slight redness may be seen. Pain on the forced depression of the base of the tongue is an important symptom. The mirror should be used. Between the glosso-epiglottic fossæ, and, as a rule, unilateral, the abscess is seen, at first of a darkish-red colour, and with a smooth, tense wall. Later it assumes a yellowish tint, from the presence of pus.

In the graver forms, when the abscess is less localized, diffuse infiltration takes place of the whole of the base of the tongue, accompanied by œdema of the lingual surface of the epiglottis, and sometimes, though rarely, of the aryepiglottic folds. The latter may be so much infiltrated as to interfere with respiration, which is also affected by the immobility of the operculum.

Extremely painful to touch, there may usually be perceived in the swelling a feeling of tumefaction rather than distinct fluctuation, which latter is very difficult to observe. Sometimes fluctuation may be made out by pressing over the base of the tongue with two fingers.

Adenopathy, though sometimes wanting, is usually present. The retromaxillary glands, when swollen, are painful to the touch.

*Course.*—This resembles that of an ordinary tonsillar abscess, which if left alone discharges spontaneously. Sometimes a fistula may remain, or a pocket which, by discharging imperfectly, causes reinfection.

*Complications.*—The most important are œdema of the surrounding structures, interfering with respiration, or purulent infiltrations of the sublingual region, the gravity of which we recognize.

The *prognosis* depends on the degree of infiltration and on the treatment adopted.

*Diagnosis.*—This is, as a rule, easy if the throat is properly examined by means of the mirror. Ludwig's angina (super-hyoidean gangrenous phlegmon) should not be mistaken for abscess of the lingual tonsil, as the symptoms of the latter are quite distinctive. Acute abscesses localized to the epiglottis are also easily recognized by the mirror.

*Treatment.*—This is similar to that exhibited in phlegmonous tonsillitis. As soon as diagnosis is established, incision, preferably with the galvano-cautery, should be used to prevent the possibility of extension. This is carried out by means of the mirror after cocainizing the region.

The galvano-cautery, as in all tonsillar abscesses, has the advantage of thorough penetration into the substance, and thus, by making a free opening, secures efficient drainage.

If the suppurative process extends to the floor of the mouth, early and free external incision should be made. Tracheotomy is only to be carried out if the patient's life is endangered from interference with respiration.

### Chronic Abscess of the Base of the Tongue.

Chronic suppuration in the lingual tonsil may be met with, but it has not, the writer believes, been noted by other authors who have written on the affections of this fourth tonsil. He has met with some cases: one that of a woman of fifty or so, who expectorated pus with great frequency, and in whom the depression of the tongue by the spatula caused pus to well from the centre of the lingual tonsil. There was very slight redness and swelling of the gland, and no adenitis. From time to time, either from cold or ingestion of irritant liquid, etc., acute suppuration took place, accompanied by pain and swelling of the parts. Occasionally even an œdematous infiltration appeared on the lingual surface of the epiglottis and the glosso-epiglottic folds.

In such a case a differential diagnosis would arise between



a chronic suppurative folliculitis, an adenoiditis, or a suppurative cyst.

The treatment consists of opening the abscess freely, and then swabbing the cavity with a solution of zinc chloride.

If this is unsuccessful, curetting should be performed. It must be remembered, that such lesions in this region endanger life.

### Hypertrophy of the Lingual Tonsil.

A hypertrophy of the mass of closed follicles situate between the base of the tongue and the epiglottis.

*Etiology.*—Dr. Lennox Browne, in 1880, was the first to draw attention to this affection. Since that period other observers, and especially Renault, have devoted themselves to the subject.

The etiology is similar to that of the other tonsillar hypertrophies—repeated inflammatory attacks, certain infectious diseases, as measles, influenza, scarlatina, rheumatism, etc., seem to influence its development.

For many years we have drawn attention to the influence of secondary syphilis on this hypertrophy, which, temporary at first, becomes permanent.

The constant use of the voice, either in singing or speaking, is an equally sure cause of inflammation and chronic hypertrophy of this organ.

Although Renault states, that the disease occurs specially between eighteen and fifty-five, we think with Escat that some cases of persistent coughing in infants are due to the hypertrophy of these masses.

Hypertrophy may also occur in leukæmia or pseudo-leukæmia.

*Symptoms.*—In some individuals there are no symptoms whatsoever, and the condition is only discovered, as it were, by chance.

A sensation as of a foreign body in the throat, or a constant desire to clear the throat, is frequently complained of. At other times there may be troublesome coughing, and it

is said even to be the cause of a variety of pharyngeal tenesmus. In the case of professional singers the author has observed huskiness, due most likely to congestion of the pharynx, or perhaps to excessive vocal efforts. Œsophageal spasm, bronchial asthma, syncopal crises, have also been noted. These functional symptoms appear especially during an inflammatory attack. There is, however, no parallel between the degree of hypertrophy and the intensity of this reaction; in fact, the symptoms are often seen in individuals who have little or no hypertrophy of the lingual tonsil, and they may persist after the gland has been reduced to its normal size. They appear thus to be due more directly to a general neurotic condition.

By the laryngoscopic mirror, the mass, red in colour, varying in size from a pea to a gooseberry seed, can be seen lying in front of the epiglottis. Between the follicles is a network of more or less distended veins.

Sometimes the hypertrophies are more marked, and are seen as mammillated masses about the size of an almond on each side of the median glosso-aryepiglottic fold. These masses are frequently furrowed antero-posteriorly into two or three lobes, and may project on to the epiglottis. This hypertrophy spreads laterally to the base of the anterior pillars, or gives rise to a polypus-like structure. It may also join the palatine tonsil, and thus it explains how ulceration in the one passes to the other tonsil.

The histology of this hypertrophy resembles that of the buccal tonsil.

*Course.*—As a rule the hypertrophy remains stationary, but in some cases, from repeated inflammatory attacks, it reaches a large size.

It may remain for an indefinite time, but it has a tendency to diminish, and even disappear, in the aged.

The *prognosis* is benign, but is graver in the case of those who use their voices as orators, singers, from the vocal disturbance it causes. In neurotics also it induces disturbance from the choking sensation in the throat.

*Diagnosis.*—In addition to those symptoms enumerated

above, we have some which are associated with what is termed the paræsthesia of the larynx.

Secondary syphilis may, perhaps, be thought of, but the presence of buccal patches, roseola, adenopathy, etc., should remove any doubt.

*Treatment.*—If the tonsil is not large and if it is only inflamed, gargles or pigments may be used, as :

R Iodine	...	...	30 centigrammes	gr. 5
Iodide of potassium	...	40	„	gr. 6
Laudanum (Sydenham's)		4	grammes	ʒi
Glycerine	...	...	120 „	ʒiiss

Or—

R Antipyrin	}	...	...	āā 5 grammes	{	gr. 75
Resorcin						gr. 75
Cherry-laurel water	...	15	„			ʒiv
Glycerine	...	...	150	„		ʒiv

A teaspoonful to be added to half a glass of tepid water for use as a gargle thrice daily.

The above may also be employed pure as a paint once or twice a week.

If this should prove unsatisfactory, then the following may be employed :

R Antipyrin	...	...	5 grammes	gr. 75
Tincture of guaiacum	...	15	„	℥ ccxl
Spirit of peppermint ('alcool de menthe')	...	...	10 „	℥ clx
Glycerine	...	...	100 „	ʒiii

A teaspoonful to half a glass of tepid water, to be used as a gargle morning and evening, or pure, as a paint occasionally.

If the masses are large enough to cause annoyance, they should be removed by means of the galvanic knife, which should be applied flat, taking care to penetrate the tissue. Only one side should be done at once, in order that deglutition may not be disturbed too much.

If the tonsil is very prominent, it should be removed by a tonsillotome or a morcellement forceps. The cold or gal-

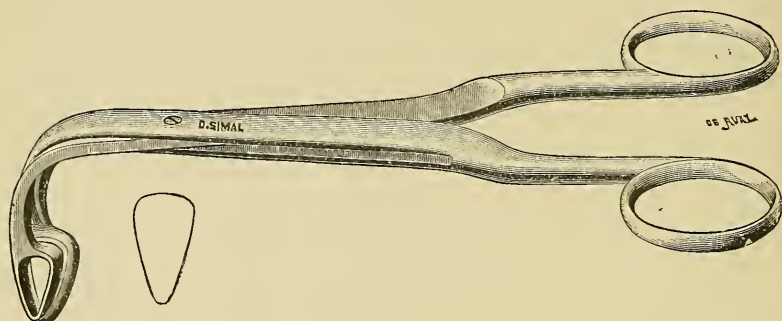


FIG. 39.—FORCEPS FOR THE LINGUAL TONSIL.

vanic snare can also be used, the wire being appropriately bent to encircle the mass.

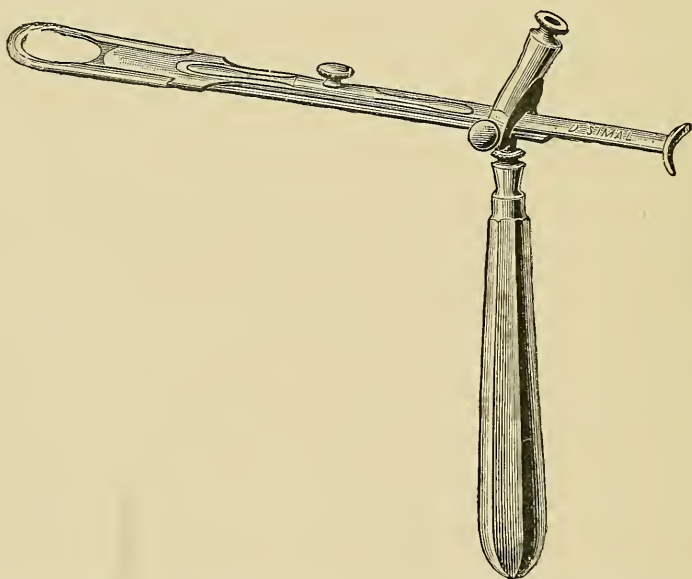


FIG. 40.—LENNOX BROWNE'S TONSILLOTOME, SLIGHTLY CURVED TO SEIZE AND REMOVE THE HYPERTROPHIED LINGUAL TONSIL.

Some authors recommend the curette as efficient. The subtonsillar tissue should not be touched, as cicatrices result,

which may set up a condition more painful and troublesome than that caused by the hypertrophied tonsil.

After the operation the patient should be kept in his room,

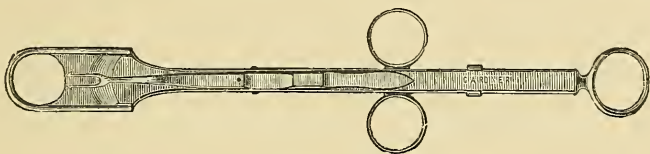


FIG. 41.—BEHAG'S TONSILLOTOME.

especially in winter, from twenty-four to forty-eight hours, and directed to use an emollient gargle.

### Cysts of the Lingual Tonsil and of Bochdaleck's Canal.

German authorities have described under this name a little blind duct, which opens into the foramen cæcum. According to Verchère and Dénucé it exists in about one in four of the individuals examined. From the foramen it is directed downwards to the median glosso-epiglottic fold. The

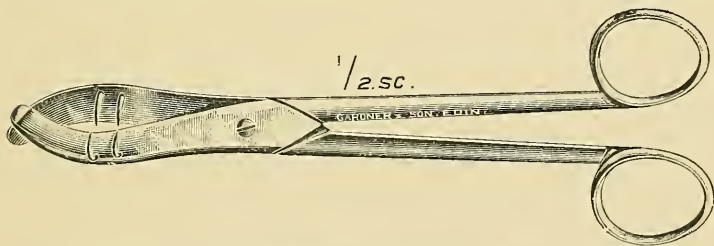


FIG. 42.—ERICHSEN'S TONSIL SCISSORS.

duct is richly provided with glands, and is covered by cylindrical epithelium, furnished with cilia. From this diverticula sometimes pass into the substance of the genio-hyo-glossus muscle. It is from the occlusion of this canal that cysts are said to start. These vary much in bulk, and reach the size of a gooseberry-seed or a small walnut. They occupy the entire substance of the tongue, and become



so large as to interfere with respiration from pressure on the epiglottis.

Externally these cysts show no distinctive features, and it is only from their position, and from the character of the fluid contained in them, that a diagnosis can be made. The contents consist of mucus with cylindrical epithelial cells, which have become detached from the walls of the canal. From infection we have the chronic suppuration already described.

In addition to those originating from the thyro-lingual canal, true glandular cysts occur, formed from the dilatation of a canaliculus, or of a gland in that region. These are situate either on the lingual surface of the epiglottis or on the median or lateral glosso-epiglottic fold.

In appearance they are yellowish and globular, with smooth walls, traversed by a fine vascular network. They are hard, and the contents are generally liquid, colloid, or even purulent. These cysts also possess cilia in their walls. The author is inclined to think that diagnosis is established more from the situation than from the nature of the contents.

*Treatment.*—Whatever may be the nature of the retention cyst, the treatment is the same—viz., incision, evacuation of the contents, and the removal of part of the cyst wall. The incessant movements of the tongue and the constant passage of food prevent the closing of the wound, and thus favour the secondary infection of its edges, thereby contributing to the entire removal of the neoplasm.

### Varix of the Base of the Tongue.

In the examination of the larynx or lingual tonsil it is common to see two or three venous clusters formed by the anastomosing of veins, which join the internal jugular. These violet, knotted, and cord-like masses vary in size, and are often seen in old people.

In addition to this superficial varix, there are usually some deeper clusters. These do not really exhibit any functional or objective symptoms except hæmorrhage, produced

generally by the deglutition of irritants, as spiced food or alcohol.

The paræsthesia, which is sometimes complained of, belongs more properly to a true neurosis of the throat. Though the quantity of blood expectorated is small, it frightens the patient, and makes him seek advice, as he is apprehensive of phthisis pulmonalis. These masses bleed readily.

*Treatment.*—Astringent gargles, as the following :

R Biborate of soda	}	...	āā	4 grammes	{	gr. 60	
Antipyrin						gr. 60	
Extract of krameria	}	...	āā	15	,,	{	gr. 60
Tincture of guaiacum							℥ ccxl
Tincture of eucalyptus		...		5	,,	℥ lxxx	
Glycerine	...	...	...	130	,,	ʒiii $\frac{3}{4}$	

A teaspoonful of this to be added to half a glass of tepid water. Gargle the throat two or three times a day.

If the hæmorrhage is excessive and the bleeding spot is clearly seen, the galvano-cautery can be employed with success.

## Benign Tumours of the Lingual Tonsil.

*Symptoms.*—The functional symptoms of these relatively rare tumours vary from the sensation of a foreign body in the throat to grave respiratory interference. Deglutition, usually easy, is sometimes rendered difficult in consequence of mechanical impediment to the food, or by the passage of the bolus into the air tract.

Respiration is only impeded when the neoplasm is so large as to press down on the epiglottis. This is especially seen in children.

Cough may be absent, but is sometimes spasmodic, and brought on by phonation or deglutition. It may be accompanied by nausea. The voice is changed, and becomes muffled or nasal.

The objective examination may be made with an ordinary

tongue-depressor, but preferably with Kirstein's or Escat's. The laryngoscopic mirror may also be employed. The latter method has the advantages of causing less nausea and of being more easily carried out.

The following neoplasms are found in this locality :

1. **Papilloma**.—This is a rare neoplasm. It shows a mulberry-like structure, with characteristic rosy-grey colour, and varies in size, being pedunculated.

2. **Fibroma**.—This is usually associated with osseous, lipomatous, myxomatous, or cartilaginous tissue, either pedunculated or sessile, varying in size from a haricot bean to a mandarin orange or billiard-ball. Yellowish in colour and of smooth surface, it is usually circumscribed and encapsulated in the substance of the tongue. If this tumour contains cartilaginous or bony tissue, it is hard and nodular.

It has no tendency to ulcerate. Some authors have noted cases where spontaneous hæmorrhage has taken place, similar to that seen in the fibrous polypi of the naso-pharynx, but this the author has never seen.

3. The **Lipoma** resembles the fibroma very much. It varies in size, and has a yellowish colour. Lobulated and soft, it is situate just below the mucous membrane, which forms a capsule. Its course is slow. Though usually sessile, it may be pedunculated.

4. Pure **Chondroma** and **Adenoma** of the lingual tonsil are very rare.

5. **Angioma** of the lingual base is fairly common. It is usually congenital, and associated with analogous tumours elsewhere.

They are flabby, of a bluish colour, irregular in shape, and frequently of a mulberry-like appearance. They are reducible in some cases. If their walls rupture, serious hæmorrhage may result.

6. **Mixed Tumours**.—Fibro-lipomatous, myxomatous, and even chondromatous elements, are present. They are nearly all encapsulated, and easily enucleated.

7. **Lingual Goitre**.—This is developed at the expense of an accessory thyroid gland. According to Curtis and

Gaudier, lingual goitre occurs most frequently in females—usually in adults. Its size varies considerably, from a cherry to a hen's egg.

This lesion is usually accompanied by hypertrophy of the lingual tonsil; the bloodvessels are well developed, which accounts for the great vascularity of the goitre. It may be movable and free, but is usually immobile and buried in the substance of the base of the tongue.

Hæmorrhage may occur, but it is not characteristic. It is interesting to note, that in some of those cases the principal thyroid gland is absent (Curtis and Gaudier). The development of those morbid productions is not well known,

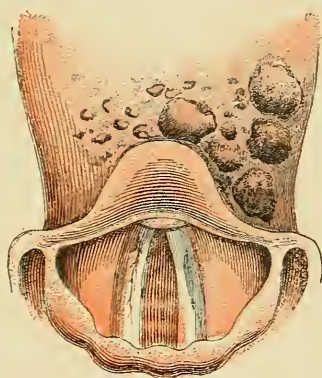


FIG. 43.—ANGIOMA OF THE BASE OF THE TONGUE, OCCUPYING THE LINGUAL TONSIL ON THE LEFT SIDE.

as the patient only complains when the growth has attained an excessive size (egg, walnut, etc.).

*Prognosis* is good. Even when the tumours are of large size and interfere with deglutition and respiration, they very rarely cause death.

*Treatment*.—Removal by means of excision, morcellement, enucleation, the cold or galvano snare, according to the site and volume of the tumours. In vascular tumours bipolar electrolysis or galvano-section is recommended.

Lingual goitre is similarly treated, but in order to extirpate it, an external operation should be performed by means of a mesial incision.

One of the various methods employed is a suprahyoid mesial incision, extending from the inferior maxilla to the hyoid bone. This does not give easy access to the growth. Wolff's transmaxillary method is no better in that respect, and leaves too large a wound. The author prefers the trans-hyoidean incision recommended by Curtis, Gussenbauer, and Vallas. It admits of easy access to the base of the tongue, and is almost bloodless. If a preliminary tracheotomy be performed, so that the air-passages can be plugged and the chloroform continued to be administered through the canula, a relatively easy operation can be performed. The author has practised it several times, and always with an excellent result. After removal of the tumour the two edges of the lingual wound should be brought together with deep catgut sutures, and in the same way the two fragments of the hyoid bone are joined. The muscles are also sutured with catgut, but the skin with horsehair. No drainage-tube is required, as there is no tendency towards suppuration. If, however, a local infection should take place, a drain can be easily introduced by opening the sutures, etc.

The tracheal canula can be removed in forty-eight hours—if there is no serous infiltration, which might interfere with respiration. If the buccal route be chosen, either with or without tracheotomy, the patient must be put into Rose's posture, to prevent the blood passing into the respiratory passage. It must be remembered that in those benign tumours enucleation can be accomplished, and the operation thereby facilitated very much.



## CHAPTER IV

### PATHOLOGY OF THE SOFT PALATE

#### Defects of Conformation.

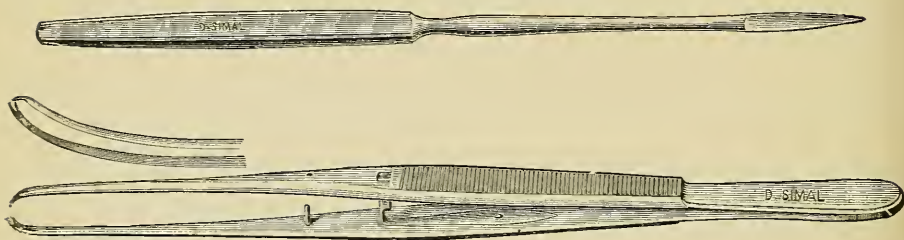
THESE are velo-palatine insufficiency, bifid soft palate, absence of the pillars, and congenital perforations.

**Velo-palatine Insufficiency.**—Lermoyez, in 1892, first drew attention to this condition, which is characterized by more or less shortening of the soft palate. It is very common in children, and is invariably present in those who have been subjected to a urano-staphylorrhaphy, or even simple division of the palate, in spite of the wide liberating lateral incisions.

The chief symptom is nasal speech, more or less resembling that occurring in children affected with paresis or paralysis of the palate, but there is no regurgitation of fluids through the nose. This defect in articulation is due to the failure of the palate completely to close the naso-pharyngeal cavity during the emission of certain sounds, and has been described by Kussmaul as ‘*rhinolalie ouverte*.’ It is easily diminished, or temporarily stopped by closing the anterior nares of the child. Examination readily reveals the shortening and tension of the palate, which can only be imperfectly elevated and approximated to the posterior wall. In those cases the uvula is nearly always found to be small and badly developed. Egger draws attention to a slight submucous notching of the posterior portion of the palatine vault, which is common among those operated on for ‘*gueule-de-loup*.’ Adenoid vegetations are frequently present in this affection, and if abundant, they may prevent the palate from rising, and to a certain extent simulate shortening of the organ.

*Treatment.*—In very marked cases occurring in children and adolescents free lateral incisions may be made.

**Bifid Soft Palate.**—The bifid state of the soft palate, the mildest form of which is the bifidity of the uvula, generally occurs with congenital divisions of the palatine vault and hare-lip. This defect gives rise to a



FIGS. 44, 45.—VOLSELLUM, STRAIGHT OR CURVED, AND STRAIGHT BISTOURY.

series of vocal disorders, which resemble those caused by velo-palatine insufficiency. The sole remedy is staphylo-rhaphy.

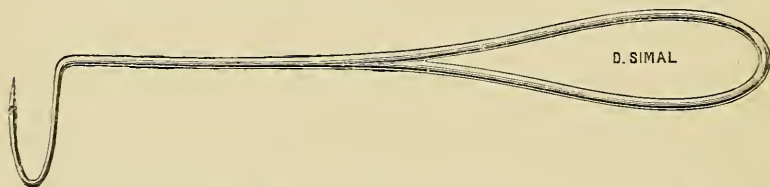


FIG. 46.—DUTCH NEEDLE, HIGHLY CURVED TO SUTURE PALATE.

**Absence of the Pillar.**—The author once saw the posterior pillar absent, giving the pharynx a peculiar appearance. The absence of cicatrization, etc., precluded the possibility of disease.

**Congenital Perforation.**—This defect consists in the loss of substance of the lateral parts of the pharynx at the level of the pillars. These perforations are usually symmetrical—sometimes unilateral, vertical, oval, without any trace of cicatricial tissue. They are congenital, though

long regarded as acquired, but cause no trouble, except when particles of food enter and produce slight inflammation.

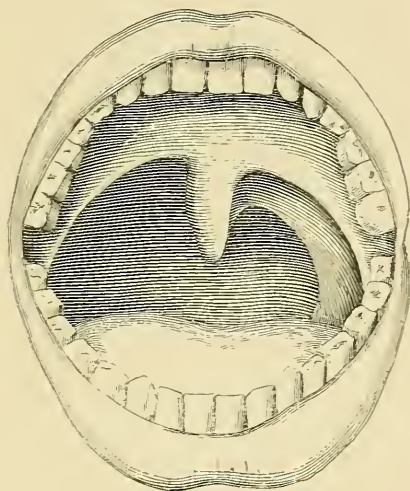


FIG. 47.—ABSENCE OF THE POSTERIOR PILLAR (MOURE). (DRAWN FROM NATURE.)

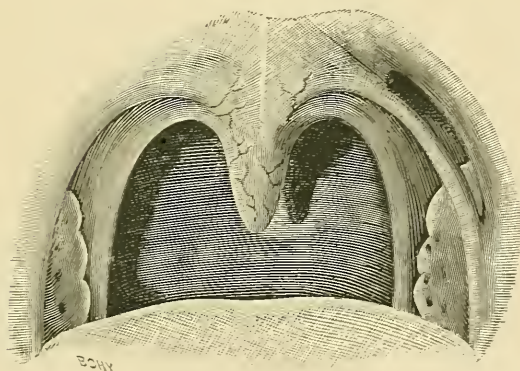


FIG. 48.—CONGENITAL PERFORATION OF THE ANTERIOR LEFT PILLAR.

If the patients are inconvenienced by those openings, it is easy to afford relief by paring the edges and joining them with the help of one or two sutures of Florence hair.

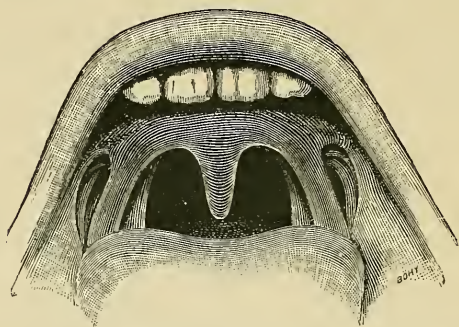


FIG. 49.—CONGENITAL PERFORATION OF THE TWO ANTERIOR PILLARS.

### Inflammation of the Uvula.

In some cases acute inflammations of the pharynx are confined to the palatal appendix. The same causes which produce acute diffused catarrhal angina or folliculitis make

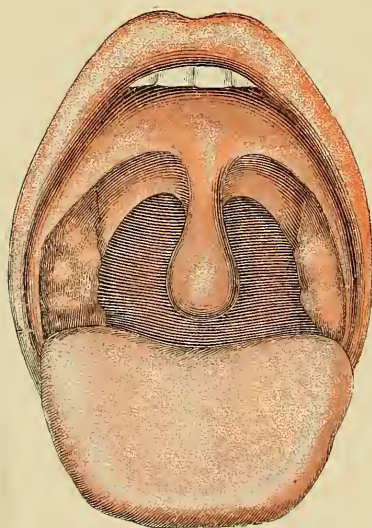


FIG. 50.—ACUTE OEDEMA OF THE UVULA (ACUTE UVULITIS).

the uvula swell, become of a rosy tint, cedematous, and resemble the air-bladder of a fish. This inflammation sometimes occurs in a few hours—twelve to twenty-four.

The main outstanding symptom is the sensation of a foreign body moving in the pharynx, and creating a continual desire to swallow.

Phonation is dull and nasal, but no pain is felt.

Treatment consists in the excision of the extremity of the uvula, or by scarifying it with the bistoury or the galvano-cautery. First cocainize the uvula, and while supporting the organ with a spoon, etc., make a series of fairly deep vertical incisions. An emollient gargle may now be given, and a cure will ensue in from twenty-four to forty-eight hours.

### **Hæmatoma of the Soft Palate and of the Uvula.**

Apart from every sign of cachexia or purpura, there is seen true hæmorrhage on the anterior surface of the soft palate, or at the level of the uvula. This lesion occurs during meals, and is independent of the nature of the food taken.

It is known as hæmatoma, submucous hæmorrhage, or uvular apoplexy.

It appears suddenly, with a characteristic blackish suffusion, raising the mucous membrane, like that seen in pemphigus.

This hæmorrhagic tumour may burst spontaneously or disappear by absorption, leaving no trace after two or three days.

### **Relaxed Uvula.**

*Etiology.*—Prolongation of the uvula is not rare in the various chronic affections of the pharynx. It occasionally occurs as a defect in children, also in paralysis of the soft palate and of the pharynx. Very long uvulæ may also be observed in aged patients.

The symptoms may be benign or assume a grave aspect—a dry, painful cough, produced by a tickling irritation in the throat, becoming spasmodic or suffocating during the night. Sir Morell Mackenzie has noted nausea, due to the same cause.

This disease is easily diagnosed by direct examination, but



its aspect varies at different stages. The uvula may even touch the teeth, owing to the relaxation of the levator palate muscle.

*Treatment.*—Astringents may have some effect, but the simplest method is the abscission of the affected part. To accomplish the latter, cocaineize the organ, grasp the end with long forceps held in the left hand; then hold in the right a pair of curved scissors, and cut at the end of the muscular portion, thus leaving a uvula large enough to fulfil its function. The post-operative treatment consists of emollient gargles, lasting from three to four days, and cool semi-solid food.

If, as is frequent, very free bleeding occurs, it may be stopped by applying the forceps or a ligature to the part affected.

### Syphilis of the Soft Palate.

The soft palate and the pharynx are most frequently attacked by tertiary syphilis. In the circumscribed gummatous form there appears a smooth, red, fairly defined, rounded, somewhat painful swelling at the junction of the soft palate and the vault, or on the soft parts themselves above the uvula, or on the sides, without other symptoms than a slight inconvenience in deglutition and phonation. If treatment is not

carried out soon, the central part of the swelling becomes hollowed, showing one or more anthracoid, greyish, cup-shaped depressions, which speedily become ulcerated, with red, well-defined edges, on a palish background. Gradually a velo-palatine perforation supervenes, with consequent complications—modification of the voice and nasal regurgitation.

The ulceration becomes gradually more extensive, the

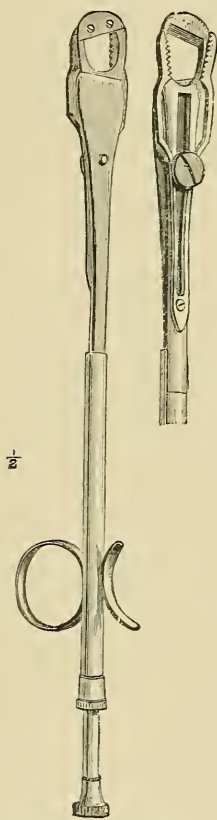


FIG. 51.—MORELL  
MACKENZIE'S UVULO-  
TOME.

parts affected blending together and producing extensive destruction of the pharyngeal tissue. The uvula becomes an irregular fungoid mammillated stalactite in the middle of

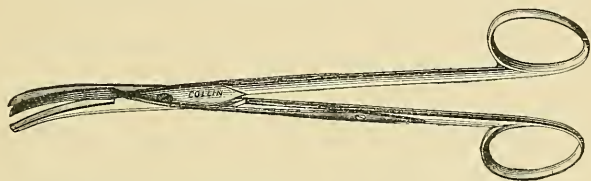


FIG. 52.—WAREN'S SCISSORS FOR EXCISION OF THE UVULA.

a serpiginous ulceration, which extends to the pillars, the tonsils, the base of the tongue, and even to the pharyngeal wall.

This grave form of syphilis is fortunately very rare, because

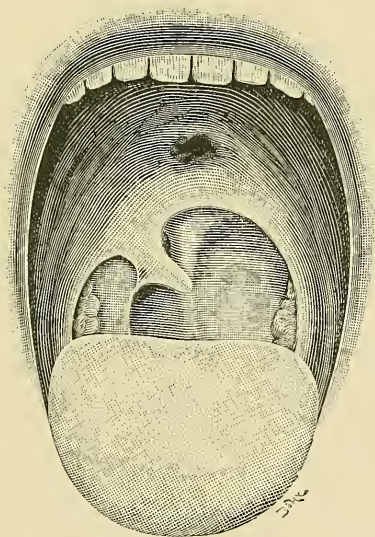


FIG. 53.—TERTIARY PERFORATION SITUATE AT THE JUNCTION OF THE SOFT PALATE AND THE VAULT (CICATRICAL SYNECHIÆ).

usually, on a diagnosis being made, treatment arrests further development. As a result of those gummatous ulcerations, perforations or stellate cicatrices of a yellowish appearance occur on a pale mucous membrane.

In some diffused gummata, which are rarer, the soft palate has a reddish surface, partly infiltrated and immobile, whence very marked nasalization, regurgitation, and often painful deglutition may occur.

The gummata originate on the posterior surface of the soft palate or in the nasal region, and are visible only when perforation occurs, as a small greyish indentation with red edges. The rhinoscopic mirror must be employed to determine the exact extent of the disease. In these posterior forms vocal disturbances, difficulty in swallowing, with tinnitus and pains in the ears, early occur as functional symptoms. These are frequently unobserved.

The fairly rapid course of the disease and the appearance of the lesion are sufficiently characteristic to render diagnosis easy. The use of biniodide solution, with hygienic treatment, peroxide of hydrogen, and borate or salicylate of soda gargles, is recommended.

### Paralysis of the Soft Palate.

*Etiology.*—Paralysis of the soft palate is often due to diphtheria. It occurs in any type of this disease. The characteristic signs usually appear on convalescence from eight to ten days after the apparent cure.

Paralysis is seen in some acute diffuse non-diphtheritic angina. It may originate in a tonsillar abscess, in those cases appearing on the affected side, or as the result of lesions of the nerve-centres, hæmorrhages, tumours, etc., or of peripheral neuritis.

*Symptoms.*—Phonation becomes nasal, due to the relaxation of the structure whose function it is to close the nasopharyngeal cavity. The patients are unable to pronounce certain consonants: a *b* becomes an *m*, and a *d* an *n*; and, in addition, they can neither blow nor suck. Deglutition is equally interfered with; the naso-pharynx, being widely open, permits the regurgitation of liquids.

These paralysees are most frequently accompanied by diminution or loss of sensibility, and in consequence frag-

ments of food find their way into the trachea and cause spasmodic coughing. Death has even ensued. In grave cases the paralysis extends to the pharyngeal muscles.

If the paralysis is partial, the voice and the deglutition are less affected; the regurgitation takes place only when the patient swallows too greedily or carelessly.

When paralysis is complete it may be observed, on the mouth being opened and the tongue depressed, that during the pronunciation of the sound 'ah' the soft palate remains quite motionless and relaxed at the level of the pharynx. The uvula remains flaccid, and the paralyzed portion may be touched without causing any movement towards the naso-pharynx.

*Course, Duration, Termination.*—Paralysis of infectious origin lasts for several weeks or months. It usually disappears gradually, either spontaneously or under treatment. If the loss of movement is due to a central lesion or to peripheral neuritis, it follows the course of that disease.

*Diagnosis.*—The difficulties of phonation and deglutition are so well defined as to be alone sufficient to determine the diagnosis.

**Velo-palatine Hemiplegia.**—As the result of certain tumours, of fracture of the base of the skull, of tubercular or cancerous adenitis, paralysis of one side of the soft palate may take place. It may also appear as a sequel of bulbar paralysis or syringomyelia.

It may happen that post-diphtheritic paralysis may commence in the one side and pass to the other, or remain on the side originally affected.

*Pathological Anatomy.*—M. Lermoyez has shown that this disease is not due to a lesion of the facial nerve, as previously supposed, but to an alteration of the vago-spinal, which innervates the muscles of the soft palate, excepting the tensor palati. The alteration, according to Escat, may be due to inflammatory or degenerative neuritis from constriction or destruction of the vago-spinal. The disease occurs not only in adults, but in children.

*Symptoms.*—The functional symptoms—viz., nasalization and regurgitation of fluids—are less marked than in complete paralysis, and are unilateral.

On examination of the pharynx, one side of the soft palate is seen to be raised, while the other remains immobile, causing a very characteristic deformity. The deviated uvula is drawn to the healthy side, which on contraction becomes markedly concave.

Escat adds to those symptoms tachycardia, due to insufficient action of the vago-spinal, and a cough of a whooping nature.

*Diagnosis.*—The diagnosis of this hemiplegia is easily made by direct examination. Interrogation determines whether the paralysis is due to a pharyngeal inflammation or to a motor nerve lesion. In the latter case velopalatine paralysis is always accompanied by similar changes in the muscles of the larynx.

The cause of the nerve changes need now alone be sought for. A full examination and interrogation of the patient will enable one to determine the diagnosis.

*Prognosis* depends on the nature and seat of the lesion.

*Treatment.*—The treatment will depend on the cause and nature of the disease.

Post-inflammatory paralysis generally disappears of its own accord. It is often the same with slight post-diphtheritic paralysis. However, in grave cases, injections of serum, in doses regulated by the age of the patient and the severity of the attack, should be made. Tonic treatment (arsenic, strychnine) favours recovery.

In both cases electrical treatment applied to the uvula and the nape of the neck simultaneously, or with both poles in the mouth, will assist muscular contractibility and shorten the course. Regurgitation gradually disappears, but the voice remains unaltered till physiological recovery is complete.



## Tumours of the Soft Palate.

### BENIGN TUMOURS.

There are seen on the soft palate, the pillars, or uvula, various benign tumours—papillomata, fibromata, enchondromata, myxomata, angiomatica, lipomata, adenomata, and dermoid tumours.

*Etiology* is as yet rather obscure. The growths only occur in adults, and according to Bosworth, with whom the author agrees, in women more than men, in the proportion of two to one. The symptoms vary much, according to the nature and bulk of the growth and its situation.

The growth may escape observation, but when the tumour



FIG. 54.—DIAGRAMMATIC APPEARANCE OF A FIBROMA OF THE UVULA AND OF A CONGENITAL DIVISION OF THE RIGHT ANTERIOR PILLAR. (AFTER MEYJES.)

is pedunculated (papillomata) and titillates the larynx, it may incite 'hemming' or even spasmodic cough. Besides, when it has attained a certain size, nasal phonation and alalia occur, with disturbances of deglutition, accompanied by regurgitation. Sometimes even respiration may be impeded, especially during the night.

The appearance of the pharynx varies somewhat, according as the tumour contents are solid or liquid.

### SOLID TUMOURS.

**Fibroma**, which is seated very often on the soft palate. It is rose-tinted, white, or yellowish. A very delicate vascular network covers its surface. Usually it is formed of one or two unequal lobes. It is smooth, hard, non-fluctuating, and

very rarely pedunculated, and adheres to the surfaces on which it grows. It may attain to the size of a big chestnut. The course is slow and progressive.

**Chondromata** and **myxomata** are extremely rare.

**Lipomata** of the soft palate are fairly uncommon. They are irregular in form, and are generally lobated. The consistency of a lipoma is soft and doughy, of a yellow hue, covered with a fine pellicle of mucous membrane, which encapsules it. It progresses very rapidly by acute attacks, and is painless.

**Papillomata** almost always occur as greyish or rosy-grey tumours of cauliflower-like shape, joined by a pedicle,

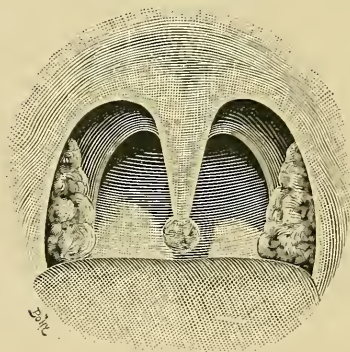


FIG. 55.—PAPILLOMA OF THE EXTREMITY OF THE UVULA.

either to the uvula or at the level of the anterior pillars. When the papilloma is small, it very often rests on the soft palate or on the uvula, and at first sight seems to be a part of those structures; but it is easy with a probe to make out that the tumour is pedunculated. Its size varies from a grain of corn to an almond. Its development is usually protracted.

#### LIQUID TUMOURS.

1. **Angiomata** are recognizable by their irregular mam-milliform, reddish, or dark-red appearance. Very often they are congenital. However, they occur accidentally from

unknown causes. Their volume varies, as do papillomata, and they can give rise to grave hæmorrhages.

True angiomas, which are recognized by movements synchronous with the pulse, are, fortunately, very rare. They are soft in consistence, and are sometimes reducible by pressure.

2. **Adenomata.**—Papillomata and adenomata frequently occur. An adenoma appears as a smooth globular tumour,

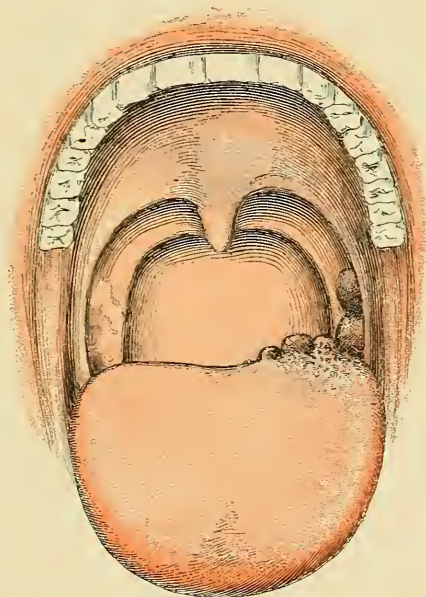


FIG. 56.—ANGIOMA OF THE SOFT PALATE AND OF THE LEFT BUCCAL AND LINGUAL TONSILS. (DRAWN FROM NATURE.)

without specific coloration. To the touch it resembles a fibroma or an overdistended cyst. Its course is slow, but it may attain a considerable volume, without any tendency to ulceration.

3. **Cysts** may be recognized by their smooth, rounded, and sessile appearance, being of a rosy-grey or pale-yellow colour, and of hard consistency, varying in size from a grain of wheat to a cherry or half a walnut. Their contents

are serous or colloid, and can be easily removed by excision.

4. **Dermoid cysts** are rare, generally congenital, and attached to the mucous membrane by a pedicle. They have usually the consistency of a softish abscess. On the contrary, when they are hard they may be mistaken for an angioma. Their contents are characteristic—fat, muscular tissue, and cartilage ; sometimes osseous tissue.

*Prognosis* is usually benign. When the cysts are removed they have no tendency to recur. An adenoma, however, may degenerate into a malignant tumour.

*Diagnosis*.—Infiltration of the neighbouring parts distinguishes gummata from those tumours.

*Treatment* consists in the removal of those neoplasms. Papillomata should be seized with the forceps and cut at their point of origin with a bistoury or galvano-cautery. The same may be said of a fibroma, lipoma, chondroma, and adenoma. If the size of the tumour is great, an anæsthetic should be given. If the angioma is troublesome, bipolar electrolysis is recommended, or ligature of the afferent vessels.

This operation may be dangerous from the vascularization of the parts, and of the growth itself.

Dermoid cysts, like the adenomata, should be enucleated.

This simple operation may be accomplished either with cocaine and the use of the frontal mirror or with chloroform, the patient being in Rose's posture. If hæmorrhage occurs, (a rare event) the carotid should be ligatured.

If the tumour sends prolongations into the maxillo-pharyngeal space, external methods should be employed.

#### MIXED TUMOURS.

Those growths of a heterogeneous description originate in the glandular recess of the soft palate, and are surrounded and isolated by an envelope of connective tissue. According to Berger those tumours consist of :

1. Epithelial elements, recalling adenoma or epithelioma.
2. A reticulation consisting of various kinds of connective tissue.

This author is of opinion, that those growths are not of endothelial origin.

*Symptoms.*—The tumours are rounded, frequently bossed, irregular, and always firm to the touch.

The mucous membrane, with which they are enveloped, is healthy and mobile, but frequently attenuated.

Those tumours are of very slow growth (eight to ten years), do not attack the osseous structure, and, although appearing to be immobile, are non-adherent to the soft palate.

Their symptoms consist of a more or less well-pronounced nasal intonation, due to the size of the tumour, which may ultimately interfere with respiration and speech.

*Diagnosis* depends on their origin, course, situation, the immunity of the mucous membrane, the mobility of the tumours, their structure, and their yellowish colour. The sole difficulty is to differentiate them from sarcoma, but the latter is rare in adults, and has a more rapid course. It is painful, less hard to the touch, and is prolonged into the nasal fossæ, accessory cavities, and the parotid recess. It perforates and destroys the bony tissue. Ulceration occurs and renders diagnosis simple. We must not forget that similar encapsuled sarcomata also may exist. They are of slow growth, and non-malignant. Melanotic sarcomata are recognizable chiefly by their dark colour, diffuse form, rapid course, and the functional complications, apart from the glandular, which they produce.

*Treatment* is fairly easy, on account of the non-infiltration of those tumours. If they are small, chloroforming the patient in Rose's posture, or anæsthetizing the mucous membrane with cocaine (1 to 10) will suffice. Then, the jaws being kept open by a gag, the palatine mucous membrane should be cut from before backwards down to and through the tumour. Enucleate with the spatula, the grooved probe, and the finger. Should the growth be very large, the preliminary operation of widening the means of approach may be performed by cutting the labial commissure on the corresponding side. If the prolongations of the tumour reach the zygomatic or pterygo-maxillary fossæ, the enucleation



should be deep, and without resort to external operation. The bleeding, which is generally unimportant, may be stopped by efficient plugging. If the tumours of the soft palate descend to the pharynx, and project below the angle of the jaw, the extra-buccal method can be employed. An incision is then made in the inferior maxillary angle, which may be resected if necessary. This method permits of the eradication of enormous tumours, even of sarcomata reaching the palatine vault. As a whole, operations of mixed tumours on the soft palate are usually easy to perform, and if well done prevent recurrence.

### Calculi of the Soft Palate.

Some interesting facts have been noted regarding calculi embedded in the soft palate around the uvula. Their size (hazel-nut) may produce disturbances of respiration and of deglutition. They are analogous to calcareous degenerations occurring in the tonsils, and are fairly rare.

*Treatment.*—A longitudinal incision with the bistoury or galvano-cautery, sufficient to permit the passage of the calculus, effects a cure. If the wound is long, a few stitches of catgut or horsehair will arrest hæmorrhage and reunite the lips of the wound.

### MALIGNANT TUMOURS.

**Sarcoma and Epithelioma** are the most common malignant tumours on the soft palate and the pillars.

*Etiology.*—This is somewhat obscure, but it seems that those growths occur more frequently in men than in women. Smoking appears to influence their development. They occur usually in middle-aged patients. Morbid degenerations are rarer on the soft palate than on the tonsils or the base of the tongue.

*Symptoms.*—Functional symptoms are insidious at the beginning. They only appear when the growths are sufficiently large to inconvenience the patient. At this stage, the soft palate being more or less immobile, the voice becomes nasal,

and deglutition interfered with ; nevertheless, there is no regurgitation. Respiration is affected only when the growth is very large or reaches the pharynx and the entrance to the larynx. Although the pains are less intense than in malignant degeneration of the pharynx, yet some patients complain of pain on deglutition extending up to the ears.

True hæmorrhage is fairly rare, but blood may be observed in the expectoration.

The general health of the patient, slightly affected at first, presents characteristic modifications at the ulcerative stage. Adenopathy of the neighbouring parts only occurs when the tumour has reached the free edges of the soft palate—that is to say, pillars and tonsils.

**Sarcoma** of the soft palate may resemble a simple warty ulceration, occupying its anterior surface. Gradually the reddish granulations grow larger, invade the surroundings, and there appears very soon above the mucous membrane an easily recognized swelling. It is usually a myxosarcoma which is found in this region. Those tumours in some cases follow simple adenoma.

**Epithelioma** usually appears as a warty tumour. Ulceration is generally rapid, yet in an exceptional case it may be absent.

The *Course* of the malady is usually progressive, and varies according to the nature of the tumour and the age of the patient. The sarcoma of adolescents may be regarded as very malignant, and its course is rapid ; but in the case of adults and the aged its development is comparatively slow. However, if its course is not checked, it progresses uninterruptedly.

*Diagnosis* between sarcoma and epithelioma is difficult, and can only be definitely ascertained by histological examination.

*Prognosis* is extremely grave in all cases, for operations apparently successful do not prevent a recurrence. The author thinks, that tumours of the soft palate clearly confined to that organ and originating in the central portion of the uvula can be radically cured, if operated on early.

*Treatment.*—The only resort is surgical treatment, which

must be as complete and rapidly executed as possible. To be beneficial the operation should be practised when the growth is limited to the central portion of the soft palate. At a later stage intervention tends to hasten the malady, rather than to retard it.

Secondary growths of the tonsils or pharynx cannot be treated with success. When the growths are confined to the uvula and soft palate the whole organ should unhesitat-

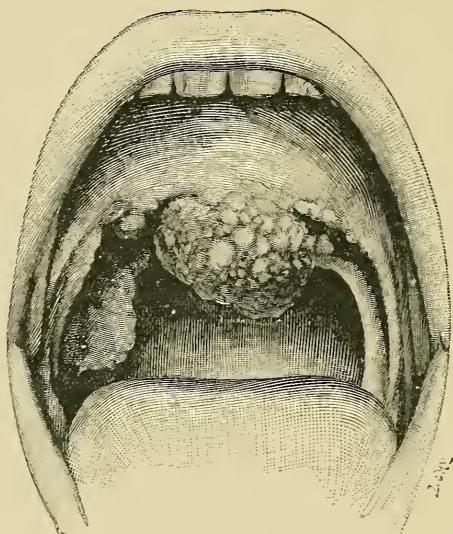


FIG. 57.—EPITHELIOMA OF THE UVULA AND OF THE SOFT PALATE.  
(DRAWN FROM NATURE.)

ingly be sacrificed with the thermo-cautery, which has the advantage of restricting the bleeding to the arteries, and simultaneously cauterizing the area of the growth.

Usually the small arteries leading to the uvula bleed slightly, but it will suffice to twist or ligature them to prevent hæmorrhage.

Palliative treatment must be resorted to when the tumours are recurrent, or cannot be operated on. The best method is to administer strong arsenical preparations internally, and paint locally with tincture of thuja, or

tincture of celandine, and thus prevent the warty growth of the tumour and the resultant respiratory disturbances. The following wash may be used :

R Adrenalin solution (1 : 100) ...	5 grammes	℥ lxxv
Extract of thuja or celandine	5 „	gr. 75
Tincture of celandine }	... āā 20 „	āā { $\overline{5}$ v
Tincture of thuja }		
Glycerine (neutral) ..	10 „	℥ cxi

This mixture may be used once or twice daily for painting, and to procure a satisfactory result, it should be thoroughly rubbed in. A teaspoonful in half a glass of boiled water may be employed as a gargle.

Swabbing with pyoctannin (1 in 100) is beneficial, but, owing to its strong discoloration of the buccal mucous membrane, it is apt to frighten cancerous patients.

### Constriction of the Isthmus of the Buccal Pharynx.

The more or less complete constriction of the orifice between the nasal fossæ and the pharynx.

*Etiology.*—This disease most frequently results from syphilis, but may follow deep ulceration of various kinds of the pharyngeal cavity.

*Symptoms.*—The constriction, when not considerable, may pass unnoticed, or be accidentally discovered. Later on, there is interference of deglutition, phonation, hearing, and, above all, respiration.

Regurgitation and nasalization ('*alalie fermée*' of Kussmaul) are observed. Affections of the ear may be due either to ulcerations situate at the level of the Eustachian tube or to the constriction of the tube itself. Nasal respiration gradually becomes impossible as the atresia advances, and the patient is compelled to breathe by the mouth.

The appearance of the pharyngeal cavity on examination varies, according to the extension of the ulceration. The

uvula may be drawn to the side, or even replaced by fibrous cicatricial tissue.

In some cases the pharyngeal wall is traversed by fibrous folds and thoroughly deformed, the pillars becoming wrinkled, the tonsils buried in the substance of the new tissue, and the soft palate frayed and anfractuons. The morbid changes depend, of course, on their cause.

*Pathogeny.*—It has been thought that the atresia was due to the contact of two ulcerated surfaces, but the author thinks

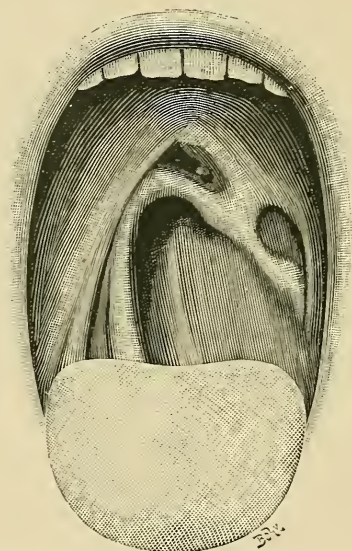


FIG. 58.—ATRESIA OF THE NASO-PHARYNX, FOLLOWING SYPHILIS.  
(DRAWN FROM NATURE.)

that the naso-pharyngeal orifice is a true sphincter, and that the constriction is from without inwards, the two posterior pillars advancing towards the centre. The naso-pharyngeal circle, being more or less infiltrated and changed into a cicatricial fibrous tissue, gradually contracts, so as to obstruct the naso-pharyngeal cavity.

The sole important point in the diagnosis is to determine the cause and treatment.

Should the naso-pharyngeal cavity merely be constricted



dilate it by a bougie introduced through the nasal fossæ. Tubes may also be passed through the mouth into the naso-pharynx.

If the cavity is wholly obstructed, make an artificial opening as large as possible mesially, preferably with a galvano-cautery, large enough to admit a bougie of an in-

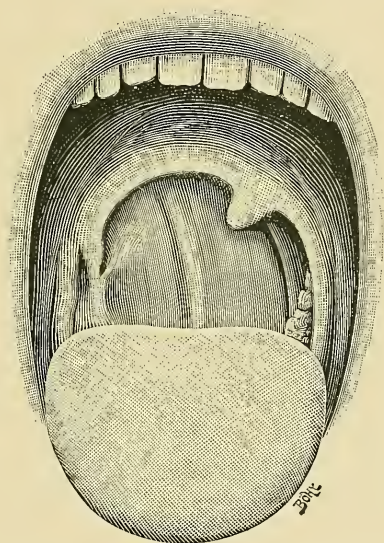


FIG. 59.—ATRESIA OF THE NASO-PHARYNX, FOLLOWING A CICATRIZED LUPUS.  
(DRAWN FROM NATURE.)

creasingly larger size. If the patient is unable to bear the bougie continuously, it may be inserted once or twice daily. The patient ought to learn the method of its introduction, so that he might pass it himself, and, if need be, dilate further the artificial opening thus made by passing from time to time different bougies or suitable instruments.

## CHAPTER V

### DISEASES OF THE PHARYNX

#### Defects of Conformation—Pharyngocele.

A MORE or less pronounced dilatation of the inferior pharynx. If the extension is confined to a single point, a pocket, consisting of the submucous membrane of the wall covering the muscular layer, is formed, resembling a true hernia of the pharynx.

The *symptoms* of pharyngocele are very variable, often nil, but occasionally characterized by a sense of fulness. The food may frequently return to the mouth, as in rumination.

The pockets may be numerous, and of variable depth.

*Treatment.*—The best method of treatment consists in closing up the entrance of the pharyngocele by inflammatory adhesions; but, unfortunately, the inflammation cannot be controlled—*e.g.*, a perforation may occur which, if deep enough to penetrate the neck or the mediastinum, may produce grave complications. The filling of the cavity can be prevented by external compression of the neck with a suitable plate. The author is of opinion that the patients themselves should empty the diverticulum by pressure from below upwards. If the opening of the pharyngocele were visible to the laryngoscope, atresia might be attempted by means of caustic or galvanic applications.

If the life of the patient is endangered the diverticulum should be opened externally, the edges pared and brought together as in œsophagotomy.

#### Wounds.

Wounds of the pharynx occur most frequently in children who injure themselves by putting articles in their mouths.

The wounds are extremely variable, depending on the article used and the mode of production. Radioscopy enables us to determine the site and nature of the traumatism.

*Symptoms.*—The chief symptom is hæmorrhage from the vessels on the pharyngeal wall. If the blood cannot escape, it may form a hæmatoma in the submucous membrane, which is usually absorbed *in situ*, or may form an abscess. Nasalization and a painful feeling in the neck on deglutition are complained of.

*Treatment* consists at first in arresting the hæmorrhage by digital compression, or by plugging with wool or gauze. If an important artery be severed, the carotid should be ligatured to prevent death from loss of blood. If a detached strip of mucous membrane has fallen into the larynx, incision should be effected by the galvano-cautery, bistoury, or other suitable instrument.

## Burns.

Burns are caused by swallowing very hot liquids, or through wilful or accidental introduction of caustic substances (sulphuric acid, caustic potash, etc.).

*Symptoms.*—The chief symptom is acute pain extending towards the ears. More or less œdematous infiltration is produced, which interferes with respiration. Sulphuric acid produces a brownish eschar, nitric acid a yellowish, while hydrochloric gives a black or deep red, and carbolic acid a whitish pellicular one.

*Diagnosis* is formed from the history and the appearance of the lesions.

*Prognosis* varies according to the depth of the lesions, and the cicatricial stenosis, which follows.

*Treatment* consists in repeated lavage of the affected parts and the application of suitable antidotes, such as milk, albumen, etc.

The œsophageal catheter, if used, must be very gently applied, to avoid perforation. Emollient gargles with coca-

leaves, local anæsthetics, and a light diet, usually liquid or nearly so, should form the basis of treatment.

### Vascular Ectasia of the Pharynx.

Dilatations of the bloodvessels are found on the pharyngeal walls. They are generally submucous and deep enough not to give rise to hæmorrhage.

On examination there may be seen on the lateral wall of the pharynx a projecting tumour, reducible by pressure, covered with healthy mucous membrane, the pulsation of which is isochronous with that of the heart.

At other times sinuous, slightly dilated, and equally pulsatile vessels are seen. Voluminous varices in the pharyngeal wall have also been observed.

### Acute Catarrhal Pharyngitis.

An inflammation confined to the posterior pharyngeal wall.

The usual causes are acute coryza, catarrhal adenoiditis, colds, excessive use of tobacco or ardent spirits.

The functional symptoms chiefly consist in a feeling of heat and irritation, specially on deglutition, painful dysphagia, and acute pains reaching to the ear. If the inflammation has affected the naso-pharynx, slight attacks of otitis media, with its usual symptoms—tinnitus, fulness, and deafness—are superadded.

On depressing the tongue, there may be seen on the pharyngeal wall redness and swelling of the mucosa, the closed follicles of which project, causing a red and granular appearance.

Small superficial erosions, or even purulent formations, may occur, and a slight œdema of the free edge of the soft palate and uvula may also exist.

By means of the laryngoscopic mirror the inflammation can be seen extending to the œsophageal orifice.

*Treatment.*—Warm inhalations should be prescribed and intranasal applications of vaseline, cocainized or borated.

The author generally employs this formula :

R Hydrochlorate of cocaine	5 to 20 centigrammes	{ gr. 3 to 12
(according to the age of patient)		
Powdered menthol	5 to 15 centigrammes	gr. 3 to 9
Boracic acid	... 1 gramme	gr. 60
Vaseline	... 15 grammes	3ii

Take a portion the size of a pea and insert into the nostril twice or thrice daily. This should be sniffed, so that it may reach the naso-pharynx.

Borated alkaline gargles, and especially painting of the inflamed wall with zinc chloride (1 in 30), are excellent methods to check the affection. If small abscesses appear they should be opened with the galvano-cautery or the probe.

### Thrush.

Although thrush is a secondary disease chiefly occurring in children and associated with disturbances of digestion, it may exist independently on the posterior wall of the buccal and inferior pharynx. It occurs more rarely in adults—*e.g.*, in advanced tuberculosis.

Locally the patient complains of a feeling of dryness or even of heat in the pharynx.

On examination, white milky spots (*Oridium albicans*) are observed projecting above the mucous membrane. If the eruption is somewhat older, the spots are yellowish, resembling cream, on a reddish, but not swollen, background. Thrush, fairly adhesive at first, is easily detached about twenty-four or forty-eight hours after its appearance.

The treatment prescribed should be an alkaline diet (eggs, milk, eau de Vichy), excluding soups and meats for two or three months.

Alkaline gargles and washes cause the thrush to disappear rapidly.



## Gangrene of the Pharyngeal Cavity.

This is sometimes localized in the pharyngeal wall, but it most frequently invades simultaneously the soft palate and the tonsils. It is generally seen in children, but also occurs in youths and adults. Usually it supervenes as a complication of infectious anginae, due to scarlatina, measles, small-pox, typhoid fever, or diphtheria, etc.

Debilitated, underfed subjects are most frequently attacked.

*Symptoms.*—The general symptoms are sometimes sufficiently grave to attract the attention of the patient and practitioner. The onset may be sudden, characterized by shivering, fever, and pain in the pharynx. Sometimes, however, the affection may be ushered in by general fatigue and by a train of symptoms resembling those of the onset of typhoid fever. At a later stage petechiæ, fœtid diarrhœa, with or without hæmorrhage, indicate the general infection of the subject.

Functionally, there occur fetor of breath, sanious or mucopurulent expectoration, often with patches of gangrenous mucous membrane.

Deglutition is painful, to such an extent that certain patients refuse to take food. Regurgitation may occur at the beginning.

Examination reveals at first redness of the pillars, tonsils, and posterior wall of the pharynx, accompanied by slight swelling. Soon afterwards a series of greyish rounded or irregular-edged patches are seen, of a size varying from a pea to a sixpence. The edges of those ulcerations are irregular and clean-cut at the expense of the mucous membrane, which is red, infiltrated, and sometimes even spotted with small phlyctenulæ which emit a fetid sanious detritus.

Subsequently the whole pharyngeal cavity is turned into an extensive ulcer. The semi-detached uvula hangs in the pharynx covered with a thick diphtheroid membrane; the pillars, the posterior wall of the pharynx, are transformed into a greyish, shapeless mass, in the midst of which it is difficult to recognize the various structures.

From time to time portions of sphacelated membrane are detached and expectorated by the patient with more or less effort, and sometimes accompanied by bleeding serious enough to endanger life.

Albuminuria is frequent. The course of the disease is generally slow, but progressive. Prostration gradually increases. Fever may disappear and the pulse become weak. The extremities get cold and the temperature falls. Profuse perspiration and hæmorrhage follow, and the patient gradually succumbs. In some very rare cases recovery takes place.

According to Trousseau, the affection may endure from eight to fourteen days. The author, however, has seen it persist for several months.

*Complications.*—The most frequent are remote hæmorrhage (lungs and viscera rarely), œdema of the surrounding parts, particularly the infiltration of the aryepiglottic folds, with its attendant respiratory disturbances.

*Prognosis* is very grave, and the disease generally terminates fatally, only about 2 per cent. recovering.

*Diagnosis.*—Gangrene of the pharynx can only be confused with diphtheria, but in the grave forms of the latter the false membranes are generally whiter, and show characteristic glandular involvement. Apart from bacteriological examination, the course of the disease, the absence of sphacelated spots and of fetid breath would suffice to determine the diagnosis. However, it must be remembered, that gangrene has sometimes been a sequel and complication of diphtheria. In those cases the diagnosis may be assured by the appearance of the symptoms already indicated.

*Treatment.*—In presence of so grave a disease, immediate and energetic means should be taken. The primary object is to maintain the strength of the patient by means of a general tonic treatment (quinine and champagne). Caco-dylate of soda can be administered, either internally or as a hypodermic injection, along with injections of serum, or caffeine, etc.

Locally the best antiseptics should be employed, according to the following method :

Regular and frequent bathing of the throat with alkaline washes or a solution of hydroxyl; antiseptic but not caustic sprays (carbolic acid, hydrochloric acid, thymol, salicylic acid, etc.) are also advantageous. From time to time the affected parts should be painted with lemon-juice, carbolized glycerine (1 in 5 or 1 in 3), or even with solution of zinc chloride (1 in 30 or even 1 in 15).

The practitioner must be very careful not to cut with the bistoury or the forceps the shreds of mucous membrane which are not yet sphacelated, as death from hæmorrhage might ensue. If œdematous complications occur in the larynx, intubation or tracheotomy can be resorted to.

### Pharyngitis Sicca.

A chronic inflammation of the mucous membrane of the pharynx characterized by dryness, with or without atrophy of the membrane.

*Etiology.*—Dryness of the pharyngeal cavity has been described as symptomatic of some affections of the nasal fossæ (hypertrophy of the turbinated bodies, adenoid growths, and abnormalities of the septum, etc.). This may also be seen in certain general affections (granular pharyngitis, cardiac affections, diabetes, or Bright's disease).

It may often have an independent existence. Two forms are recognized—chronic catarrh of the pharyngeal tonsil and a true atrophic pharyngitis.

The former is a true scrofulide, and follows catarrh of the nasal fossæ and often of the naso-pharynx. It frequently occurs in children affected with adenoid growths and of lymphatic or even strumous appearance.

The latter may be attributed to the too rapid passage of the air into excessively broad nasal fossæ, but usually is due to the slow but progressive atrophic process extending from the nose to the pharyngeal mucous membrane.

*Symptoms.*—In chronic catarrh no marked dryness of the pharynx appears. The patient expectorates, especially in the morning, a thick, yellowish, viscous secretion, often

crusted and having the characteristic odour of an ozænal catarrh. Sometimes it may appear more mucopurulent than dry. On examination after removal of this secretion, the mucous membrane appears reddish and shagreened, swollen here and there rather than atrophied, and occasionally pale and discoloured.

Rhinoscopy reveals the extension of the catarrh to the naso-pharynx, which latter is often affected with adenoiditis.

In this particular form of dry pharyngitis neither ozæna nor atrophy of the turbinated bodies is present, and it seems to be a prelupic catarrh.

In atrophic pharyngitis the act of deglutition is troublesome, and the pharynx is intensely dry. If the larynx is affected the expectorations are thick, viscous, even crusted. The naso-pharynx and the pharynx itself are lined with greenish crusts. Should the naso-pharynx be involved, hearing is interfered with (deafness, tinnitus, etc.) from catarrh of the tube.

A marked widening of the pharynx is seen, the mucous membrane being dry, as if covered with thick varnish, transparent here and there. Below this coating the membrane is wrinkled and attenuated, and is often pale and discoloured.

*Diagnosis.*—When an adult merely complains of dryness of the throat, and examination reveals the presence of a dark-red coloration with thickening of the palatal mucous membrane, the pillars, and the pharynx, the glistening look may suggest diabetes or albuminuria. If those semisolid or mucopurulent masses are observed on the posterior wall in children or youths, the nasal fossæ and the posterior nares should be examined to determine if there exists at this level a cause sufficient to produce the pharyngeal catarrh.

If traces of pus are present on the lateral walls, or only on one side, they may indicate sinus affection, and the origin of the pharyngitis may be found there.

*Treatment.*—In chronic catarrh of the pharyngeal tonsil tonic treatment is indicated (cod-liver oil, arsenic, sulphurous waters, etc.).

Locally, curetting of the naso-pharyngeal cavity is the

best method of rapidly reducing the inflammatory process. In other cases painting, nasal washes, or even nasal massage, should be resorted to.

In the atrophic form the general treatment consists in the administration of the iodide of potassium or sodium or benzoate of soda internally. A course of mineral-water treatment should prove beneficial to the patient.

Locally, nasal washes may be prescribed, with salt water, biborate of soda, or boracic acid (2 teaspoonfuls in a litre of tepid water).

Painting or spraying with an oily mentholated solution, according to the following formula, is recommended :

R	Eucalyptus	...	25 centigrammes	℥iv
	Thymol	...	5 to 15 centigrammes	gr. 1 to 3
	Menthol	...	2 to 4 grammes	gr. 30 to 60
	Liquid vaseline		100 grammes	℥iv

Vibratory massage will afford relief.

### Retro-pharyngeal Abscesses.

These abscesses, circumscribed at first, are situate in the cellular tissue surrounding the pharynx.

*Etiology, etc.*—The pharynx in its upper portion is, as it may be recalled, gutter-shaped, opening anteriorly, and forms on its under side a complete canal. It may, therefore, be inferred that abscesses of the buccal and nasal regions are at the same time retro-pharyngeal and lateral, while those situate inferiorly are sometimes mesial. There are two chief forms of abscesses in this region—viz., (1) acute inflammatory, and (2) chronic inflammatory (cold abscess).

The latter are usually of tubercular origin, and are frequently indicative of Pott's disease, or of a general affection.

Behind the pharynx and œsophagus a species of cavity exists, bounded posteriorly by the prevertebral aponeurosis, and anteriorly by a cellular space, which facilitates the movement of those organs.

On each side is seen the sagittate follicle of Charpy. The cavity is liable to become distended by air or fluid, and



extends from the base of the skull to the mediastinum. At the level of the naso-pharynx it is divided longitudinally into two secondary cavities.

Inside the cavity, in the middle of the cellular tissue, lie on each side the superior ganglia of the sympathetic, and the lymphatic glands of Gillette.

The retro-pharyngeal glands receive the lymphatic vessels from the nose, the Eustachian tube, the naso-pharynx, and the pharynx. Those organs are usually the seat in which retro-pharyngeal infection starts. Acute abscesses of the pharynx are fairly rare, occurring frequently in children, and sometimes in adults. Lymphatic temperament, debility, and bad hygienic conditions, all conduce to this pyogenic lesion. In some cases the disease is a sequel of an eruptive fever, influenza, acute bronchitis, purulent coryza, acute adenoiditis, or suppurative otitis media.

*Pathological Anatomy.*—The pus is situate in the naso-pharynx, buccal pharynx, or inferior pharynx. The abscess is usually unilateral at its commencement. The pus is generally fetid, viscid, and yellowish, but it contains no specific organism.

The symptoms at first are sometimes those of a mere angina or acute coryza. At other times, and especially in children, the onset passes unperceived. In the case of unweaned infants, lack of appetite and respiratory difficulties are observed. Fever, accompanied by shivering and nausea, convulsions, and general dejection, appear soon after. The least movement of the head is painful. The troubles of deglutition increase, and are complicated by regurgitation. Respiration is interfered with. Then dyspnœa and stridor supervene, accompanied with croup-like suffocative spasms. Those symptoms are due to the peripheral infiltration, which often extends to the laryngeal orifice, or immobilizes the crico-arytenoid articulation on the affected side. The voice remains normal, with a slight nasal timbre.

In adults functional troubles are more easily observed, are less pronounced, and are mainly confined to difficulties of deglutition.

Externally, if the abscess is mesial, the neck is stiff, but not swollen; if lateral, there appears behind the angle of the jaw a swelling, accompanied by adenitis, and painful to the touch. At a later stage, if the pus extends beyond the pharyngeal aponeurosis, the signs of latero-pharyngeal abscess are observed.

An examination of the throat, which is rather difficult in the case of children, shows a red infiltrated pharyngeal wall, projecting towards the buccal cavity up to the soft palate. On laryngoscopic examination, it is observed that the swelling extends backwards to the entrance of the œsophagus, or to the posterior wall of the larynx.

The soft palate and the tonsils are usually unaffected, or simply pushed forward.

Fluctuation is perceived by the touch.

External, combined with pharyngeal, palpation reveals the presence of a large purulent accumulation, extending beyond the pharyngeal wall.

Edema of the neighbouring structures is observed almost entirely in inferior or diffuse retro-pharyngeal abscesses, and then occupies the aryepiglottic folds or the arytenoid region.

*Course.*—In the case of inflammatory abscesses the course is generally rapid. In four or five days pus accumulates, usually more rapidly in median retro-pharyngeal cases than in the lateral.

At other times suppuration takes place by successive exacerbations, lasting for weeks or months, or even becoming chronic.

The author has seen adult cases *without finding any osseous lesions*. In those cases the local and general symptoms are much less pronounced, whereas deglutitional disturbances predominate.

*Prognosis.*—If the abscess is left to itself it may, although very seldom, open spontaneously, and then the pus escaping into the pharynx and the larynx may cause death, which happens frequently in children.

Asphyxia may also result from the respiration being impeded through œdema. During the later stages grave hæmorrhages,

due to ulceration of a large vessel, may occur, with fatal results.

*Diagnosis* is easy, when the abscess is developed, but at its outset in children it may be mistaken for the various inflammatory lesions, including diphtheria. The introduction of a

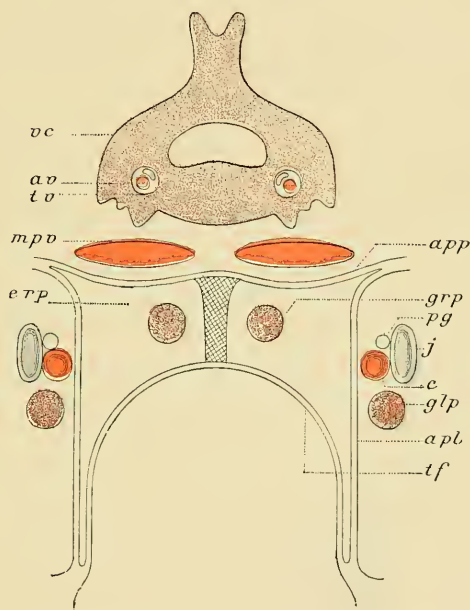


FIG. 60.—DIAGRAMMATIC HORIZONTAL SECTION OF THE NORMAL RETRO-PHARYNGEAL SPACE. (ESCAT.)

For the sake of distinctness we have coloured the principal organs of the region.

Explanation of the diagram: *vc*, Cervical vertebra; *fv*, vertebral foramen; *av*, vertebral artery, accompanied by the vein in blue; *mpv*, prevertebral muscles; *grp*, retro-pharyngeal ganglion; *erp*, retro-pharyngeal space; *app*, prevertebral aponeurosis; *tf*, fibrous coat of the pharynx; *apl*, lateral aponeurosis; *pg*, pneumogastric; *j*, jugular; *c*, carotid; *glp*, latero-pharyngeal ganglion.

foreign body into the pharynx is usually accompanied by suffocative spasm, but direct examination will determine the cause.

Adenoiditis is characterized by disturbances of nasal respiration, pains in the ears, an intact pharyngeal wall, with absence of troubles in deglutition. The usual position of

the neck will be of valuable assistance in diagnosing Pott's disease or ostitis. In adults it might be confounded with a gummatous infiltration of the pharyngeal wall, but in the latter the swelling is almost painless, characteristically hard, confined to the lateral portion of the pharynx, is fairly circumscribed, and very soon shows on its surface a characteristic crateriform ulceration.

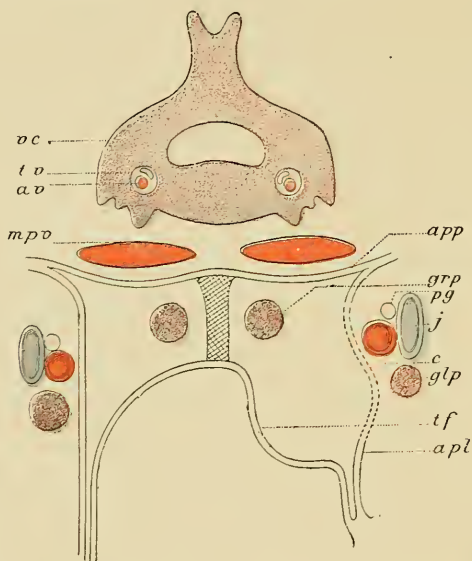


FIG. 61.—DIAGRAMMATIC HORIZONTAL SECTION SHOWING THE MODIFICATIONS OF THE RETRO-PHARYNGEAL SPACE IN THE LATERAL ABSCESS OF THIS REGION.

The explanation of the diagram is the same as in Fig. 60; the difference consists in the projection forwards of the fibrous coat of the pharynx which juts out. The dotted lines indicate the tract by which the pus arrives at the latero-pharyngeal space. The vasculo-nervous bundle is pushed outwards.

Chronic abscesses are recognizable by their slow course and by the presence of fluctuation.

Suppurative adenitis is accompanied by external symptoms so characteristic as to preclude any doubt of their nature.

The diagnosis consists in differentiating between retro-pharyngeal abscesses and the purulent collections in the external wall of the tonsillar crypt, or in the latero-pharyngeal region.

A. When the disease originates in the retro-pharyngeal gland (posterior and lateral abscess) the retro-pharyngeal aponeurosis is pushed forward, while the lateral fibrous plane is thrust outwards. Often the affection extends through this wall to the latero-pharyngeal recess, where it produces adenitis.

B. In other cases, the infection originating in the posterior wall extends rapidly, probably through the lymphatics, to

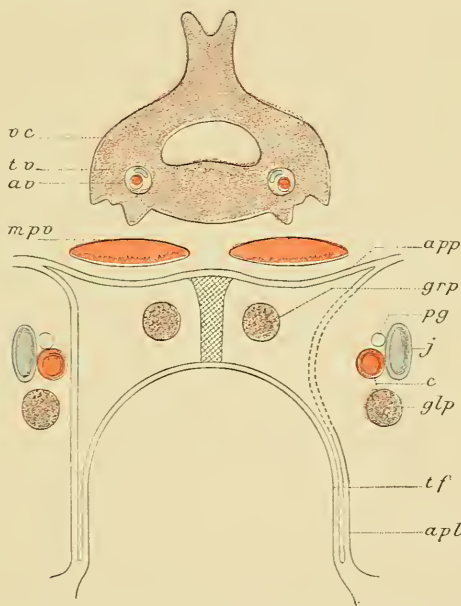


FIG. 62.—DIAGRAMMATIC HORIZONTAL SECTION, SHOWING THE MODIFICATIONS OF THE LATERO-PHARYNGEAL REGION IN ABSCESES SITUATE OUTSIDE THE LATERAL APONEUROSIS OF THE PHARYNX, *apl*. (Cf. FIG. 54.)

The posterior fibrous wall *tf* is normal, but the dotted lateral aponeurosis to the right of the figure is crowded inwards, pushing in front of it the tonsil, and causing a marked swelling on the lateral side of the neck.

the tissues situate outside the lateral aponeurosis. Simple retro-pharyngeal adenitis then occurs, and pus collects in the latero-pharyngeal region, pushing inwards the intervening wall. In those cases the lesion is outside the pharynx, and the peripheral swelling takes place outwards, the reverse being noticed in the preceding case.



C. External peritonsillar abscess is also seated inside the lateral aponeurosis of the pharynx, which it pushes outwards, and the pus—at least, at the outset—is inside, but the latero-pharyngeal portion is swollen and projects outwards. The diagrams will indicate how the rupture of the over-tense and affected lateral aponeurosis may change a simple retro-

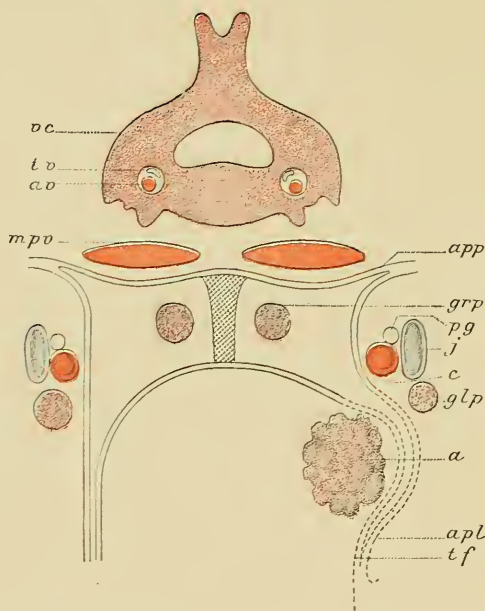


FIG. 63.—DIAGRAMMATIC HORIZONTAL SECTION, SHOWING THE EXTERNAL REGION OF THE LEFT TONSIL (*a*) IN THE CASE OF ABSCESS ORIGINATING FROM THIS PART OF THE TONSILLAR RECESS. (RIGHT SIDE OF THE FIGURE.)

The fibrous coat of the base of the dotted crypt *tf* blends with the lateral aponeurosis *apl*, while the vasculo-nervous bundle is pushed outwards and backwards. If the lateral wall ruptures, the pus then forms the latero-pharyngeal phlegmon; if it resists, the pus penetrates into the mouth around the tonsil. This is usually the case.

pharyngeal abscess into an external peritonsillar or a deep and diffuse phlegmon of the neck, or latero-pharyngeal abscess. In this way grave vascular lesions and their severe complications are explained.

*Treatment.*—At first we should endeavour to check the

abscess by warm inhalations, by compresses applied to the anterior part of the neck, and by a purgative. But if the diagnosis points to an abscess, incision should be made as early as possible.

A bistoury, failing a more suitable instrument, is wrapped round with diachylon, or even paper, so that its point alone is uncovered. The patient's mouth being kept open, and the tongue depressed behind the dental arch, an incision is made at its most prominent part. With intractable children a few whiffs of ethyl bromide or somnoform will facilitate the operation.

On the evening of the operation, or the day after, it may be necessary to keep the edges of the wound open to aid the escape of pus. In adults a 1 in 10 solution of cocaine with adrenalin will produce complete anæsthesia.

The author prefers to use the galvano-cautery, as it admits of the affected parts being widely opened, and remaining so long enough to enable the pus to escape.

Often when the abscess is opened, in the case of debilitated patients, syncope or even death supervenes. As there is a considerable amount of pus in the abscess, even when it appears small, it will be advisable to tap it, so as to permit the pus to escape gradually, and thus prevent its irruption into the air passage.

Antiseptic washing of the mouth and pharyngeal wall (hydroxyl in boiled water, Vichy water, boiled borated water) should be carefully performed by the medical attendant, till the patient is completely cured. If the pharyngeal abscess is complicated by inflammation of the cellular tissue of the neck and by external swelling, it would be better to reach the abscess externally. An abscess impossible to open through the mouth may thus be thoroughly drained. The opening should be made at the anterior, or preferably at the posterior, edge of the sterno-mastoid. The incision should be methodically performed layer by layer with good illumination and with the grooved probe. A drainage-tube should then be placed in the wound, and kept there, until the fistulous opening is completely cured from below upwards.

## Chronic Pharyngitis.

*Synonyms.* — Granular angina, hypertrophic granular pharyngitis.

Granular pharyngitis has in recent years lost much of its importance, owing to our better knowledge of diseases of the throat. Generally speaking, those projecting ovular granulations, resembling split peas, adhering to the posterior wall of the pharynx, are the necessary symptoms of chronic inflammation of the pharyngeal cavity, rather than the cause of the troubles of which the patient complains.

*Etiology.*—Those granulations of the pharynx often met with in children may be regarded as the terminal portion of Luschka's tonsil. They are merely the symptoms of a more important lesion. True granular pharyngitis is frequent, especially in youths and adults, particularly in those who make an exaggerated use of their voice, or are exposed, by profession or by habit, to irritation of the throat.

*Symptoms.*—In children hypertrophy of the closed follicles of the pharyngeal cavity coincides almost always with a swelling of the pharyngeal tonsil.

Other symptoms are a feeling of malaise in the pharynx and a tickling and burning sensation, which causes the patient to hem, especially in the morning. The feeling of constriction and of a foreign body in the throat may be due to neurasthenia, rather than to chronic inflammation of the closed follicles of the pharynx.

Functional symptoms are observed only at the time of acute or subacute onsets, and vary according to the nature and degree of the inflammation. In some cases pain is felt extending up to the ear. Those troubles are more pronounced in chronic hypertrophy of the lingual tonsil, on account of the friction of the latter on the epiglottis, or when the hypertrophy is seated in the dihedral angle formed by the base of the tongue and the origin of the anterior pillar.

Readily occurring congestion of the larynx with huskiness complete the symptoms of granular pharyngitis. Objectively two forms are met with. In the one, called exudative (Sir

Morell Mackenzie), the mucous membrane is smooth and even, reddish, and here and there swollen. The vessels are dilated and sinuous. The pharyngeal wall is covered with a greyish very adhesive mucus. This secretion is seen in the naso-pharynx, as this disease is usually accompanied with chronic adenoiditis. In the other form there may be seen on the posterior wall of the pharynx reddish, more or less confluent granulations, adherent to the mucous membrane. In chronic forms they appear as projecting, irregular ridges, situate, as a rule, behind the posterior pillars.

Each granulation is surrounded by a vascular network, which sharply defines it. The glands of the mucous membrane are themselves often inflamed and covered over with a whitish, viscous secretion, which must be removed to disclose the pharyngeal wall.

*Diagnosis* is generally easy, but we must be careful not to confuse secondary hypertrophy of the closed follicles of the pharyngeal cavity with cases fairly rare, where this chronic inflammation is a true morbid entity. The nasal fossæ, the posterior nares, the accessory cavities of the throat, and the base of the tongue should be carefully examined, in order to exclude all concomitant lesions, capable of causing chronic hypertrophic folliculitis of the pharynx.

Care must be exercised not to assign to granular pharyngitis the whole series of nerve disturbances inevitably associated with neurasthenia. These different nervous troubles abate at the time of deglutition, whereas true inflammatory affections are then increased.

The prognosis is grave only when laryngeal or auricular complications occur.

*Pathological Anatomy.*—The changes are seen chiefly at the level of the lymphoid tissue of the muciparous glands and the connective stroma of the mucous membrane.

*Treatment* should be directed to the sources of the disease—the nasal fossæ, pharyngeal cavity, or base of the tongue. If the folliculitis requires a special treatment, the simplest method is, either to curette the granulations or paint them with an aqueous solution of iodide of potassium (1 in 5). At

other times galvanic ignipuncture should be employed ; but the cauterization must not be too deep, as it might harm the patient more than the granulations do. General treatment may have good results, and a course of mineral waters (sulphurous, arsenical, or alkaline) will be advantageous. In benign cases alkaline bathing of the throat, according to this formula, will suffice :

R Iodine	...	...	...	25 centigrammes	gr. 4
Iodide of potassium	...	...	...	30	„ gr. 5
Tincture of opium (Sydenham)				3 grammes	℥l
Tincture of guaiacum	...	...	...	5	„ ℥lxxx
Glycerine (pure)	...	...	...	120	„ ̄iiss

A teaspoonful in half a glass of tepid water as a gargle, once or twice a day, or undiluted painting once or twice weekly.

### Foreign Bodies in the Pharyngeal Cavity.

*Etiology.*—Insensibility of the mucous membrane or paralysis of the constrictor may favour the retention in the throat of bodies of various natures and sizes.

*Symptoms.*—The chief foreign bodies are fish-bones, pins, cherry-stones, etc., and the symptoms vary according to the form, nature, and seat of the object. There is either an onset of choking or a sensation of very acute pain, becoming more pronounced at every movement of the neck, or a desire to expectorate or vomit. Radioscopy may be of good assistance, when simple inspection of the throat by the tongue-depressor, the laryngoscopic mirror, or by palpation would be insufficient.

*Diagnosis* is usually easy, except in the case of children or lunatics. Nervous people sometimes complain of a foreign body being present in the throat, when nothing is there. This is a case where the patient cannot localize the pain, especially when deglutition is painless. It must also be recognized, that a mere scratching of the mucous membrane may give rise to the belief on the part of the patient of the existence of a foreign body in the throat.



Complications vary according to the nature and bulk of the foreign body. Some scratches on the mucous membrane may occasion emphysema or acute œdema of the vestibule of the larynx, even ulcerous perforations of the large vessels of the neck and retro-pharyngeal abscesses, with caries of the cartilage.

*Treatment.*—The only remedy is removal. If inflammatory complications occur in the larynx, tracheotomy may be necessary. Once the nature, form and locality of the foreign body are recognized, it will be removed through the natural tracts or by external pharyngotomy. If the object is smooth it may be pushed down into the œsophagus and the stomach. Pains may remain, especially in nervous people; accordingly a tonic and antineurotic treatment is advisable.

### Paræsthesia of the Pharynx.

A series of sensations of pain and uneasiness generally occupying the pharyngeal cavity, which the appearance of the usually normal condition of the mucosa in that region cannot explain.

*Symptomatology.*—There are two forms of paræsthesia of the pharyngeal cavity—hyperæsthesia and hypoæsthesia.

HYPERÆSTHESIA is manifested by a sensation of heat and pain in the pharyngeal cavity. The patient complains of the sensation of a hot iron in the throat, or a tingling sensation, which compels him to attempt to clear his throat continually.

On examination the tongue is found to rear against the depressor. Reflexes are observed, accompanied with excessive contraction of the pharyngeal cavity. When the practitioner is aware of these nervous disturbances, he readily observes diffuse redness on the pharyngeal wall and of the suspected region, due to intense contraction of the muscles of the neck by the patient, to the consequent venous stasis and to the breath being withheld. Strangely enough, energetic brushing and painting made at that level are easily tolerated.

HYPOÆSTHESIA, on the contrary, is manifested by the

sensation of a foreign body obstructing the throat—a ball, thick saliva, or fruit peel—of which the patient tries to get rid. He hems, clears his throat, and sometimes succeeds by violent effort in detaching a viscous, and occasionally blood-streaked mucous plug.

A singular fact about this is, that when the patient is eating, drinking, or even sucking a lozenge, he feels relieved for some moments, and often, even for several hours. The author thinks, that this peculiarity is of importance in differentiating the really painful and dysphagic forms and the more or less grave and acute anginas from mere paræsthetic disturbances.

Here direct examination also shows complete integrity of the pharyngeal mucosa and of the whole pharyngeal cavity, and a mere diminution of sensibility in that region.

The general disturbances vary according as the affection is observed in neuro-arthritic or psychopathic subjects.

Psychism, indeed, gives to those disturbances a series of clinical peculiarities, which deeply impress the practitioner unacquainted with such cases.

In teachers and singers a true phonophobia is observed.

In others it is a constant anxiety, increased by their repeated examination of the throat, and discovery of more or less hypertrophied closed follicles, or caseous matter in the tonsils.

Patients suffering from hypoæsthesia are easily examined, as they, being accustomed to depress their tongue and inspect their pharynx, readily let the latter be seen.

Hypoæsthesia usually originates in an emotion—sorrow, overwork, or in the very fact, that the patient has known somebody who had succumbed to a disease of the throat. The nervous temperament always predisposes to that affection.

*Prognosis* is usually benign. It may be grave through the state of anxiety occasioned by those nervous disturbances.

*Treatment* should be both general and local. In hyperæsthetic forms antispasmodics should be prescribed—bromide, cocainized preparations, painting with bromide and glycerine, emollient gargles, physical exercise, tonics and general diet.

In hypoæsthetic forms, on the contrary, antispasmodic treatment, such as bromide, should be carefully avoided. It should preferably be attempted to rouse the sensibility by means of mentholated pigments (1 : 50 or 1 : 30), pharyngeal douches, energetic spraying of the pharyngeal cavity, and, if need be, by local electrization.

The general treatment should consist in the use of valerian preparations, and especially of arsenic and strychnine in the form of tincture of nux vomica and bitter infusions; in hydrotherapy, physical exercise, and in a thermal cure adapted to the constitution of the subject.

In some cases a suggestive galvanic cauterization of the pharyngeal wall will suffice to cure the patient.

### Tuberculous Pharyngitis.

Tuberculosis of the pharynx may commence in the pharyngeal wall. It is then of the same type as has been already described in bacillary angina—an acute miliary form—isolated lupus of the pharynx being almost unknown. The leading symptoms are considerable dysphagia, deep discoloration of the pharynx, and signs of general infection. The treatment is that of ordinary tuberculous angina.

### Syphilis of the Pharynx.

Secondary syphilis is rare on the pharyngeal wall. When it does exist, it coincides with erythematous angina and mucous patches on the pillars and tonsils, sometimes even on the uvula, tongue, and lips.

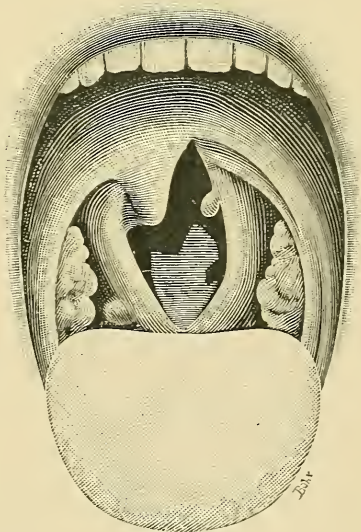


FIG. 64.

Syphilitic patches on the pharynx are always erosive, the wall being reddish and tumefied. Here the lesion itself has no red margin, such as distinguishes other lesions of the rest of the pharyngeal cavity, and resembles a scratch made by a nail or foreign body. It is covered by the greyish membrane, as is common in wounds of this region.

The functional symptoms resemble those of the concomitant angina.

Tertiary lesions of the pharynx consist in a gummatous infiltration, situate in the lateral part, or even in the mesial portion, of the wall. There are found enormous sharply defined, crateriform ulcerations, extending to the nasopharynx.

## Tumours of the Pharynx.

### BENIGN TUMOURS.

Generally speaking, benign tumours of the pharynx are comparatively rare. There have been observed myxomata, papillomata, dermoid cysts, lipomata, fibromata, enchondromata, osteomata, angiomas, and even aneurisms. The tumours originate either in the posterior wall of the buccal pharynx, on the lateral surfaces, or at the level of the inferior pharynx.

*Symptoms* are very variable. At the outset they are merely the sensation of a foreign body, troubles of deglutition, and tickling of the throat, sometimes causing nausea.

As the growth advances, the symptoms are more pronounced, and respiration and deglutition are interfered with, especially if the tumour is pedunculated, as the growth may glide down into the larynx or œsophagus.

The result of direct examination depends on the nature of the growth.

1. **Lipoma.**—The lipoma appears as a reddish growth, on which the mucous membrane has retained its normal colour. It is sessile, unilobular, and of somewhat hard consistence.

2. **Fibroma** very much resembles the preceding, except that it may be sometimes pedunculated. The diagnosis often can only be confirmed by histological examination.

3. **Enchondroma and Osteoma**, of irregular surface, though smooth, are recognizable by their consistency and their form. Indeed, they resemble a simple raising of the mucous membrane, and adhere closely to the underlying tissues with which they appear to blend.

4. **Papillomata**, generally pedunculated, and accordingly mobile, are of a muriform rosy appearance.

5. **Angiomata** have a deep red hue. They are doughy, bosselated, resilient, and reducible, without pulsation, thus differing from aneurisms, which are sometimes found on the lateral wall of the pharynx, along the course of the pharyngeal artery.

The laryngoscope, palpation, and even the probe, will be of help in the diagnosis.

*Complications.*—Sometimes certain mobile growths project into the larynx, and cause violent coughing, suffocation, and even asphyxia. In other cases the neoplasm interferes with the epiglottis, and allows the food to pass into the larynx.

*Course.*—The course is always slow and progressive, and may continue unperceived for years. Some of those benign growths become malignant.

*Diagnosis.*—The first consideration is to definitely establish the existence of the growths, as they are very often confused with the projection of the vertebral bodies. To avoid this error, stand directly in front of the patient, and request him to hold his head upright. A gumma at the period of infiltration, and a chronic retro-pharyngeal abscess may in the same way be mistaken for a growth. The development of the syphilitic lesion in the first and the presence of fluctuation in the second will readily determine the diagnosis. It is fairly easy to differentiate these growths by the eye, the only important diagnosis being the recognition of the vascular and aneurismal tumours.

*Treatment* consists in extirpation, generally through the mouth.

According to circumstances the growth should be removed with the cold or galvano-snare, the ecraseur, the cutting forceps, the galvano- or thermo-cautery. If respiration is



interfered with, preliminary tracheotomy can be resorted to. External pharyngotomy is advisable only in exceptional cases. If angiomas and aneurisms endanger life, ligature of the dilated vessel, between the heart and the aneurism, should be performed.

### MALIGNANT TUMOURS.

These are primary, or more frequently secondary by direct propagation. The latter are more frequent.

*Pathological Anatomy.*—The primary tumours of the pharynx are the epitheliomata and the sarcomata. The epithelioma is usually lobulated and of the paved variety. All kinds of sarcomata are to be seen in the pharynx, but the fasciculated is the most frequent. The malignant tumours of this part develop preferably in the vicinity of the larynx.

*Symptoms.*—At the onset functional symptoms are almost nil. As the tumours increase, disturbances of deglutition appear, a desire to hem, and sometimes even sickness and vomiting, and hæmorrhage, or at least expectorations of saliva streaked with blood. Very soon spontaneous pains arise, extending to the nape of the neck, the ear, and the angle of the jaw, and later on dysphagia, respiratory disturbances, with alteration in the timbre of the voice.

When ulceration appears the symptoms become intensified; salivation is profuse, viscid, and often ichorous and sanious. The breath becomes repulsively fetid, and the teeth and gums covered with a thick greyish pultaceous coating; the neck is stiff, and the general health changes for the worse; the patient becomes thin, and has the characteristic facial appearance of those affected with malignant tumours of the mouth or pharyngeal cavity.

Examination shows in epithelioma a red warty surface, the edges of which blend into the neighbouring tissues. The tumour is bosselated, resilient, and painful. It bleeds readily. When ulceration sets in, the centre of the tumour becomes hollowed, and purulent, and is covered with a greyish coating, while the edges of the base begin to bud, forming an irregular

red, sanious, mushroom-like growth. The edges are fixed, and are surrounded by swollen infiltrated mucous membrane.

The sarcoma appears as an irregular reddish budding growth, sometimes pedunculated. It is softish in consistency; the neighbouring structures being slightly or not at all infiltrated.

Complications of cancer of the pharynx are—œdema of the neighbouring parts; onsets of suffocation and asphyxia; hæmorrhages and disturbances of deglutition, so grave as to prevent the alimentation of the patient.

The course of those tumours is generally rapid. After being stationary for several months they develop quickly, invade the neighbouring parts, making the pharynx immobile, obstructing the œsophagus, and rapidly affecting the general health of the patient by producing a characteristic cachexia, that is due not only to the nature of the neoplasm, but to the intolerable pain felt by the patient, to the trouble of deglutition, and to the penetration of septic particles into the organism.

*Diagnosis* is based at the outset on the age of the patient, the presence of spontaneous pain, sanguinolent expectoration, adenopathy, and the course of the disease.

These tumours may be mistaken for a syphilitic gumma, but their deep ulceration with sharply-defined, irregular, and torn edges, should facilitate the diagnosis. If doubt still remains, it may be dispelled by specific treatment.

Only hybrid cases are difficult, because the mixed treatment acting on the syphilitic element may lead to the belief, that the disease is of venereal origin. Functional disturbances are of great diagnostic importance. The existence of spontaneous pain and of sanious expectoration point to a neoplasm. The presence of hard monoglandular masses, adherent and bosselated, and generally painful, indicate epithelial degeneration.

To determine the true nature of the neoplasm, it will be sufficient to take a portion of it for histological examination.

Epitheliomatous growths cannot be treated efficaciously. A radical operation is almost impossible. The results of the operation are grave, and, as a rule, the tumour grows again.

In the case of a pedunculated sarcoma the tumour should be removed by the natural tract, if necessary with the assistance of tracheotomy. The base of the growth should be cauterized by the galvano- or thermo-cautery.

Lateral pharyngotomy, with or without temporary resection of the inferior maxilla, may be resorted to; but, to be useful, such an intervention must be early, because the chances of success diminish when the growth is ulcerated.

If external operation is employed, the best method is the Krönlein process, which may be combined with Orlow's.



FIG. 65.—KRÖNLEIN'S LINE OF INCISION IS INDICATED IN RED.

Krönlein's consists in making a curved incision originating in the labial commissure, extending downwards to the level of the hyoid and ascending upwards to the mastoid apophysis. In the Orlow-Krönlein process the incision begins at the middle of the lower lip towards the chin, and follows the direction already given.

In the Krönlein incision the soft parts, thus cut layer by layer, lay bare the whole submaxillary region and the large vascular vessels.

During this first operation the region is freed of all infiltrated glands, and the submaxillary gland is removed. Then, after the external carotid, and sometimes even the common

carotid, have been ligatured, the maxilla is laid bare in front of the masseter, and sawn obliquely. The two portions are levered up, so as to lift the upper portion upwards and outwards, and the horizontal portion forward.

This operation is performed under chloroform in the usual lateral decubitus, the tongue being pulled forward by a thread. The buccal cavity or the pharyngeal wall is then opened to permit of the tumour being removed.

Generally hæmorrhage stops as soon as the neoplasm is taken away. This removal should be quickly performed, and

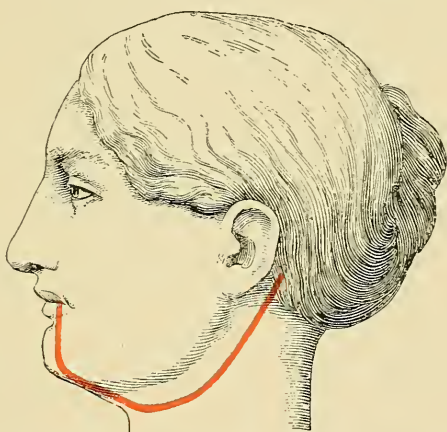


FIG. 66.—ORLOW'S LINE OF INCISION IS MARKED IN RED.

great care exercised to prevent the blood entering the trachea, which constitutes the gravest danger of the operation.

It is, as a rule, unnecessary to practise preliminary tracheotomy, if the light of the frontal mirror is adequate.

The removal of the neoplasm having been effected, the deep region should be sutured with catgut and the wound plugged with iodoform gauze soaked with hydroxyl in sterilized water. The two portions of the maxilla should be joined with silver wire and the wound partly closed, leaving room for the drainage-tubes.

Alimentation of the patient should be effected by liquid enemata for three or four days, then through the buccal

cavity with the assistance of the œsophageal tube, if the condition of the patient allows it. It is rare that the patient will permit the tube to remain long, on account of its irritating effect.

The complications are those customary to operations in this region, especially infectious broncho-pneumonia; hæmorrhages may also supervene at the eighth or even the twelfth day after operation. Very often some ramification of the facial nerve is cut, and the patient's face is thereby altered.

The mouth must be kept absolutely clean with antiseptic solutions, especially with diluted hydroxyl, to favour healing and diminish infection of the wound; but it is almost impossible to prevent this.

### Constrictions of the Inferior Pharynx.

True annular constrictions are usually caused by tertiary syphilis, lupus, and burns.

*Symptoms.*—The stenosis of the base of the pharynx develops generally very slowly, and accordingly the onset is insidious.

For months or even years atresia may be in progress, and cause no trouble but slight uneasiness in deglutition. If constriction becomes aggravated, there appears a series of local symptoms, among which occur penetration of liquid food into the trachea, and change of voice. At a more advanced stage respiration is interfered with, stertorous breathing appears, deglutition of solid food becomes impossible, and only liquids pass through the very narrow orifice.

At this stage the patient is in a state of profound collapse. Cachexia supervenes, and the voice is weak and stifled.

Laryngoscopic examination shows the base of the tongue more or less glued to the pharyngeal wall, enveloping the whole epiglottis, which may be healthy or partly destroyed. The opening into the pharyngeal cavity is very reduced, being 2 to 3 millimetres broad and 3 to 4 millimetres in length.

Sometimes the yellowish, very tense, fibrous bridges are



projected from before backwards, forming an infundibulum, at the bottom of which is the small aperture.

*Treatment.*—Local medication is usually applied too late to be useful, and especially so, if the patient has attained to the stage of stertorous breathing.

If the constriction is too pronounced, tracheotomy must

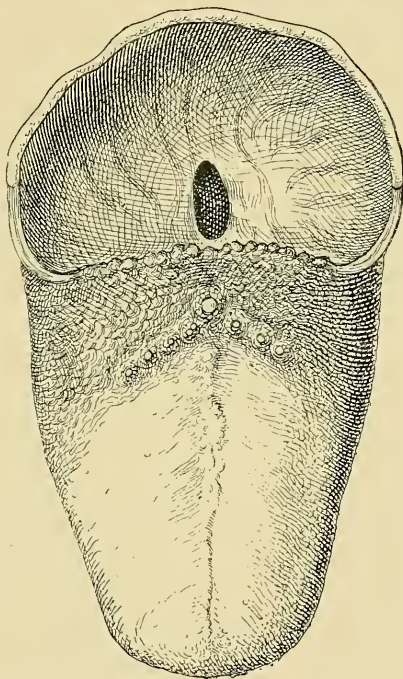


FIG. 67.—APPEARANCE OF THE INFERIOR PHARYNX IN A CASE OF CONCENTRIC STENOSIS.

The base of the tongue, the posterior and lateral walls of the pharynx, are united by a series of fibrous strictures, forming a true membranous diaphragm.

be resorted to, and it is preferable to perform it on the very middle of the trachea, below the cricoid. Should the orifice be wide enough to allow of breathing, simple dilatation, with different kinds of œsophageal tubes (Schrötter's or Beniquet's), may be tried. If mere tubage is not sufficient, some incisions can be made with the galvano-cautery. Dilatation by sudden

divulsion may also be employed, but with less beneficial result.

Electrolysis seems to be a good remedy, but is difficult and protracted.

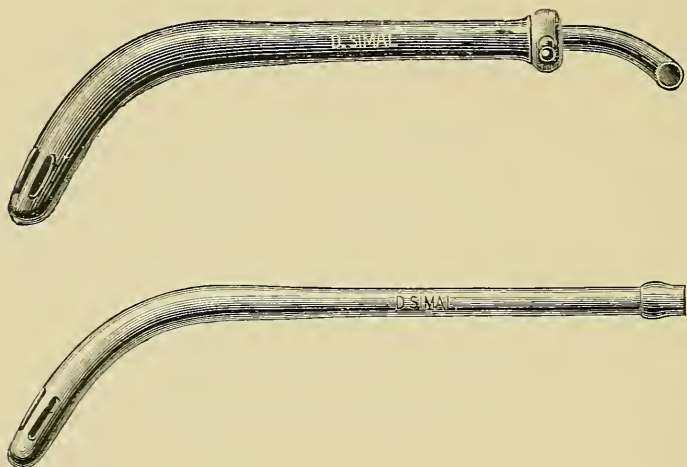


FIG. 68.—SCHRÖTTER'S TUBES FOR DILATING THE INFERIOR LARYNX.

If incision is practised on the fibrous folds, there is a danger of cutting branches of the pharyngeal artery and causing hæmorrhage.

Jacobson advises in such cases lateral pharyngotomy, so as to prevent hæmorrhage and counteract the constriction.

## PART II

### LARYNX

#### CHAPTER I

##### EXAMINATION OF THE LARYNX AND OF THE TRACHEA

MOURA-BOUROUILLOU'S method of illumining the throat, consisting of converging luminous rays from a lamp furnished with a convex lens, is nowadays superseded by that of Turck and Czermack, which is simpler and easier, the rays from a luminous source, as intense as possible, being reflected

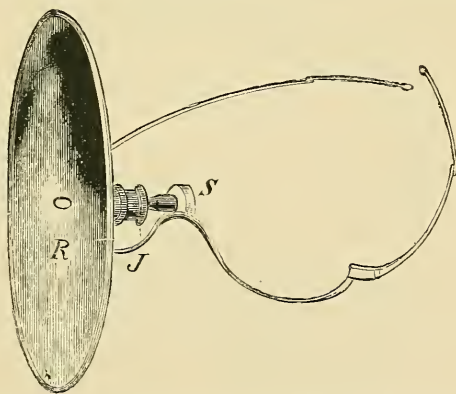


FIG. 69.—FRONTAL MIRROR, WITH SPECTACLE ATTACHMENT.

into the mouth of the patient by the aid of a concave mirror.

The reflection mirror now generally adopted has a frontal band, a spectacle mount or a spring fixing it on to the nape of the neck.

Specialists, who have electric light, use Clar's mirror or Helot's photophore.

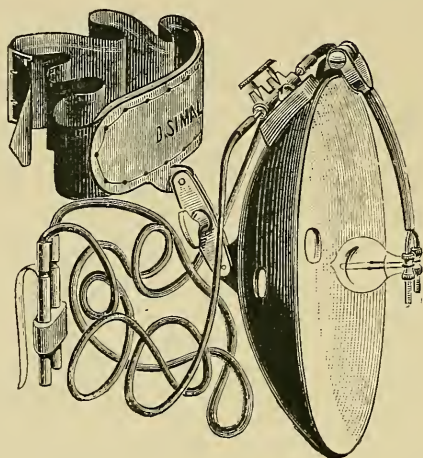


FIG. 70.—CLAR'S MIRROR, WITH FOREHEAD BAND.

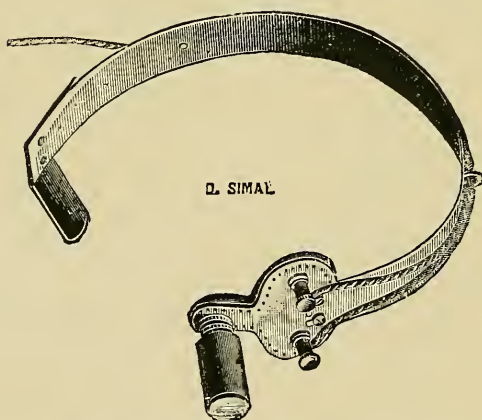


FIG. 71.—HÉLOT'S ELECTRIC PHOTOPHORE, WITH STEEL FOLDING HEAD BAND.

### Laryngoscopic Examination.

In order to practise this, first place the patient vis-à-vis, with his head slightly inclined backwards. Secondly, grasp the tongue with a linen cloth between the thumb and the

index finger, and draw it gently outwards. Thirdly, direct the rays of light in front of the uvula. Fourthly, warm the mirror to prevent its being tarnished by the patient's breath,

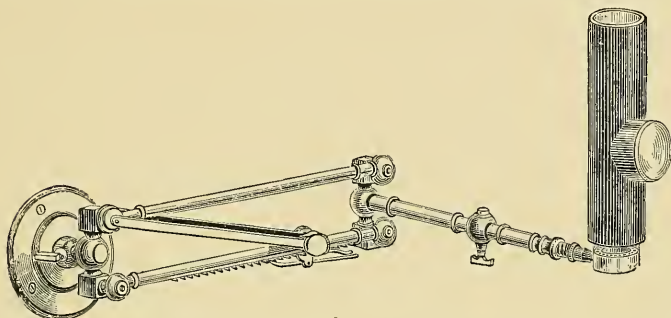


FIG. 72.—MORELL MACKENZIE'S LARYNGOSCOPIC LAMP, WITH RACHET TO RAISE AND LOWER.

and after testing its temperature on the back of the hand, introduce it into the buccal cavity. The handle of the mirror should be held in such a way, that the mirror may pass

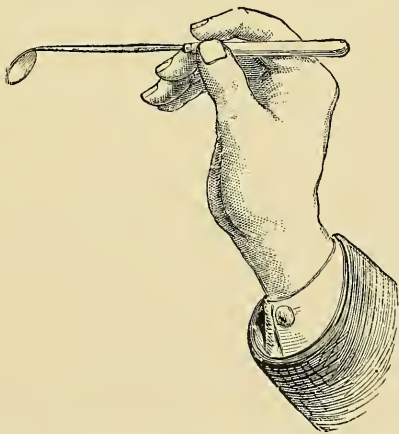


FIG. 73.—METHOD OF HOLDING THE MIRROR TO INTRODUCE IT INTO THE MOUTH.

through the dental arch parallel to the surface of the tongue and the palatine vault, touching neither the tongue nor the teeth nor the vault. The uvula is gently pushed upwards



and backwards, so that the reflecting surface is directed downwards and slightly forwards towards the laryngeal cavity.

The mirror being in position, the patient is asked to pronounce in a high tone the sound 'ch.' This effort causes the epiglottis to rise, and inspection of the larynx is usually easy; another vowel has not the same effect.

It must be remembered, that, up to a certain limit, the more acute the sound is, the better the epiglottis rises and uncovers the interior of the cavity to be examined. In order to see that the mobility of the muscles is not interfered with, slow respiration should be practised.

With children and nervous patients assistance may be required to keep the head backwards. If the pharyngeal cavity is really too sensitive, the patient may be gradually prepared for the examination by frequent painting of the soft palate and pharynx with a bromide solution, such as—

R	Hydrochloride of cocaine ...	10 centigrammes	gr. 3
	Bromide of potassium ...	1 gramme	gr. 30
	Glycerine ...	30 grammes	℥xiii

A more important obstacle to examination is the inability of the epiglottis to rise, as is usually the case in children under five or six years of age; and for that reason elevators of the epiglottis (Stoerck, etc.) have been invented. Some authors recommend that a thread should be passed through the epiglottis by means of a curved needle. It is, however, generally possible to overcome this impediment by direct laryngoscopy.

### Direct Laryngoscopy.

Some years ago Kirstein proved, that the larynx could be viewed directly without the aid of the mirror by the patient having his head inclined strongly backwards, and the electric light directed to the base of the tongue, that organ being strongly drawn downwards and forwards by means of a special tongue-depressor introduced down to the insertion of the epiglottis. In that way the epiglottis rises

and the larynx mounts upwards, thus permitting the whole cavity to be examined. Escat happily modifies Kirstein's

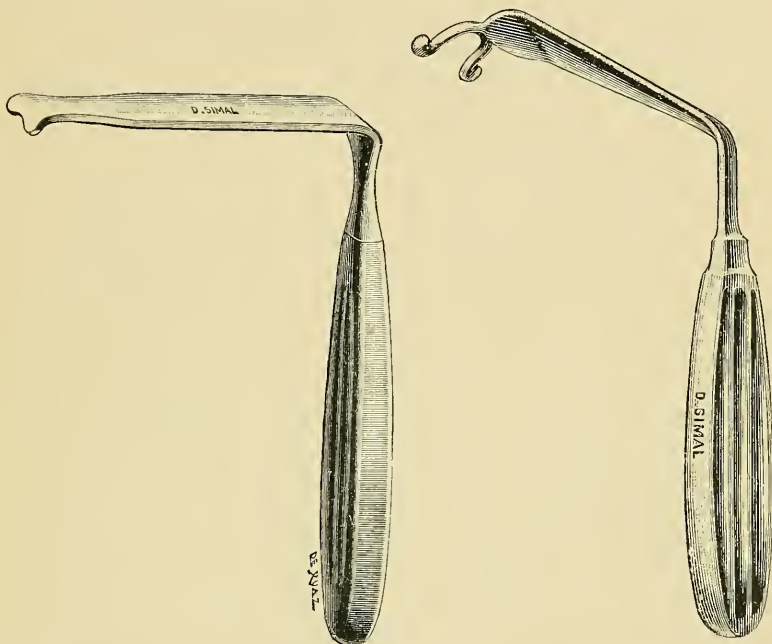


FIG. 74.—KIRSTEIN'S TONGUE-DEPRESSOR.

FIG. 75.—ESCAT'S TONGUE-DEPRESSOR, FOR DIRECT LARYNGOSCOPY.

depressor by making it double-pronged, so as to adjust itself to each side of the median glosso-epiglottic fold.

### Auto-laryngoscopy.

This was first practised by Czermack. There are two methods of self-examination of the throat—by placing a mirror above the source of light to catch the reflection from the throat-mirror, or by means of a mirror with a concave surface, the inferior part of which permits rays coming from without to pass. The operator, standing in front of a window, lights up his pharynx, and at the same time sees the image of his larynx.

### Laryngoscopic Image.

It may not be useless to recall, that the image reflected by the mirror is not upside down, but only raised in position. The anterior commissure appears high up in the mirror, while

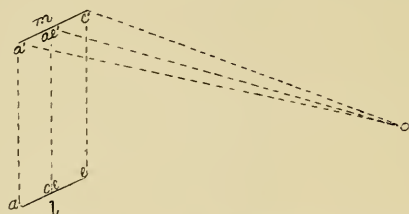


FIG. 76.—DIAGRAM SHOWING THE POSITION OF THE DIFFERENT PARTS OF THE LARYNX AND THEIR REFLECTION.

*m*, Plane of the mirror; *l*, larynx; *o*, eye of the observer; *a*, the arytenoids; *ae*, the aryepiglottic folds; and *e*, the epiglottis, which is reflected at *a'*, *ae'*, and *e'*.

the posterior portion is low down on the reflecting surface. The lateral walls do not change their position in any way, but the right vocal cord of the subject appears to the left of the observer. The laryngeal image from above down-

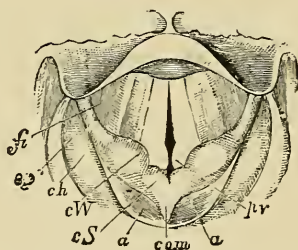


FIG. 77.—APPEARANCE OF THE LARYNX DURING PHONATION.

*pv*, Vocal apophysis; *a*, arytenoid; *com*, posterior commissure (arytenoidean); *es*, cartilage of Santorini; *cw*, cartilage of Wrisberg; *ch*, cornu of the hyoid bone; *sf*, hyoid fossa; *f*, ventricular band.

wards, or in reality from before backwards, comprises the base of the tongue, which is rosy and irregular, somewhat swollen in parts, and a little farther down the epiglottis, of a yellowish or rosy yellow aspect, and of variable form. On each

side of this operculum the aryepiglottic folds appear slightly pyriform, and of a rosy appearance, going in a downward direc-

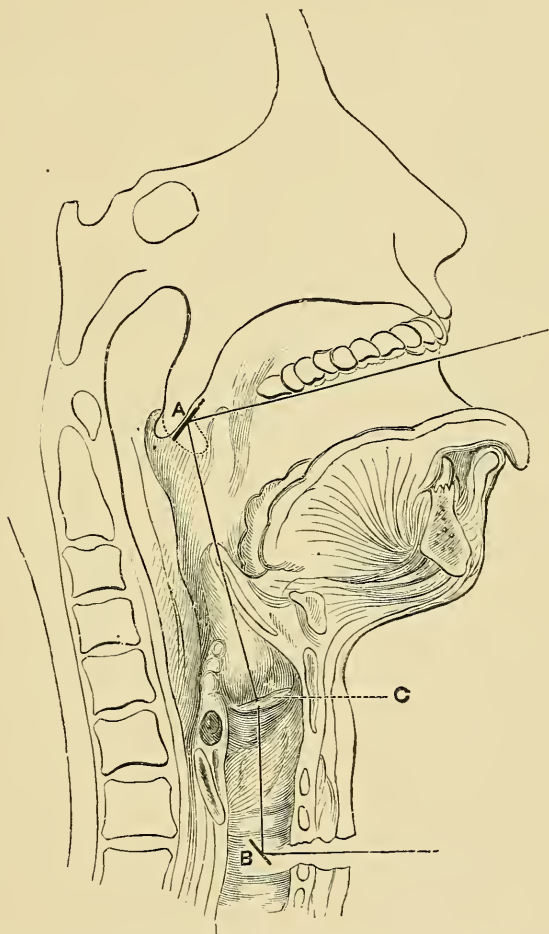


FIG. 78.—SHOWING THE ANGLE OF INCIDENCE AND OF REFLECTION DURING THE LARYNGOSCOPIC AND SUBGLOTTIC EXAMINATION.

A, Mirror; B, position of the subglottic mirror; C, left vocal cord

tion in the mirror, although they really go backwards towards the arytenoids. In their substance and posteriorly are two small yellowish projections—the cartilages of Wrisberg and

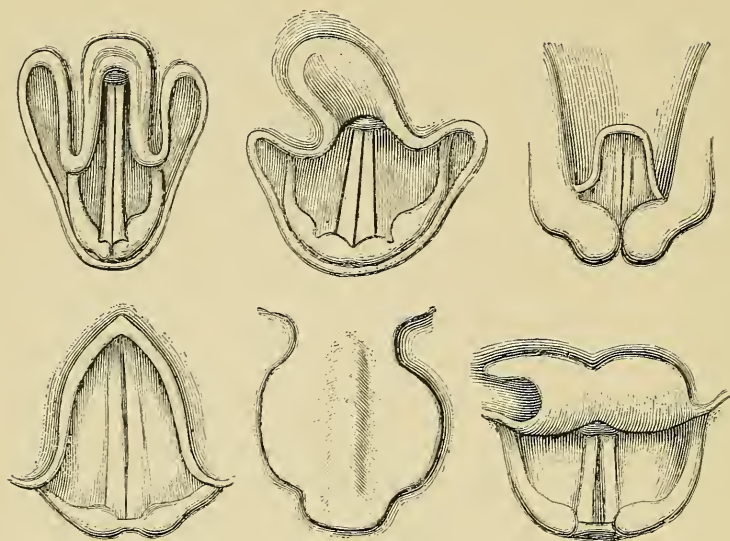


FIG. 79.—TYPES OF THE NORMAL EPIGLOTTIS.

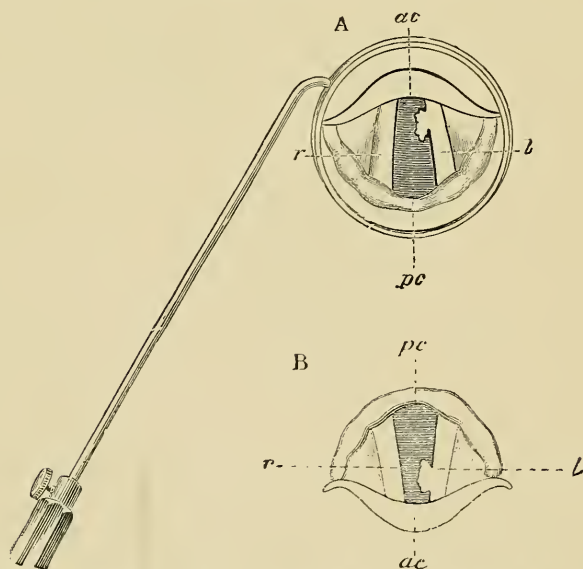


FIG. 80.—REPRESENTING THE IMAGE OF THE LARYNX B IN THE MIRROR A.

*ac*, Anterior commissure; *pc*, posterior commissure; *r*, right cord; *l*, left cord, showing a polyp.



Santorini—crowning the arytenoids. During the emission of the sound 'eh' those two cartilages are in juxtaposition mesially, closing the intercartilaginous glottis. During inspiration, on the contrary, they separate and allow the interarytenoid region to be seen—of a paler, often irregular appearance.

Within the aryepiglottic folds are seen two surfaces of a brighter rose colour in a direction from before backwards, therefore from above downwards in the mirror, extending from the arytenoid to the base of the epiglottis. Those are the false cords, or, to be more precise, the ventricular bands. Below those bands are the ventricles of Morgagni, which stand out clearly as a dark red or brown line. Below and within the ventricles appear two flattish ribbons, varying in size according to the individual, and having normally, especially in women and children, a shining appearance like the fine enamel of the teeth. Those are the true vocal cords.

During inspiration the hypoglottic region, the rings of the trachea, and even the orifices of the bronchi, may be perceived. Those rings stand out as concentric half-circles of a yellowish appearance on the mucous membrane, which is rosy.

The vocal cords seen from below (hypoglottic laryngoscopy) are rosy, like the rest of the vocal mucous membrane.

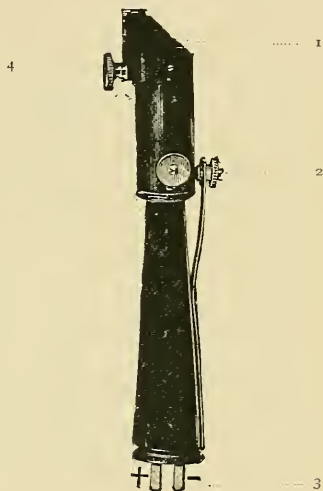


FIG. 81. — CASPER'S HANDLE, FURNISHED WITH AN ELECTRIC LAMP, WHOSE LIGHT IS REFLECTED DIRECTLY DOWNWARDS BY A PRISM PLACED AT THE EXTREMITY OF THE INSTRUMENT.

- 1, Reflecting prism; 2, electric contact button; 3, points of contact; 4, screw for adjusting this handle to Kirstein's (Fig. 74) or Killian's tubes.

## Tracheoscopy and Bronchoscopy.

Tracheoscopy is generally practised in the same way as laryngoscopy.

By taking advantage of a deep inspiration to illumine the interior of the tracheal tract, it is sometimes possible to see

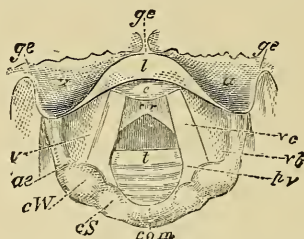


FIG. 82.—APPEARANCE OF THE LARYNX DURING DEEP INSPIRATION.

*ge*, Glosso-epiglottic folds, medial and lateral; *u*, superior surface of the epiglottis; *l*, epiglottis, free border; *c*, cushion; *v*, ventricle of Morgagni; *vb*, ventricular band; *vc*, vocal cord; *fv*, vocal apophysis; *ae*, aryepiglottic folds; *cW*, cartilage of Wrisberg; *cS*, cartilage of Santorini; *com*, interarytenoid commissure; *cr*, cricoid cartilage; *t*, rings of the trachea.

by tracheoscopy down to the bifurcation, and even a portion of the opening of the right bronchus if the head of the patient is placed slightly to the left and upwards (Kirstein and

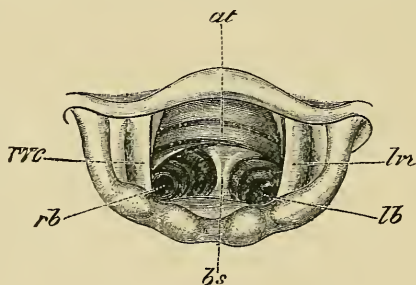


FIG. 83.—APPEARANCE OF THE ANTERIOR WALL OF THE TRACHEA, AND OF THE ORIFICE OF THE GREAT BRONCHI.

*at*, Anterior wall of the trachea; *rvc*, right cord; *lvc*, left cord; *rb*, right bronchus; *lb*, left bronchus; *bs*, bronchial spur.

Killian). This is an indirect method, as the image alone of the organ to be examined is seen.

After tracheotomy the trachea and the first bronchial

division may be inspected with the aid of a small mirror placed in the tracheal opening, the air passages being previously anæsthetized with cocaine (1 : 10). By turning the mirror upwards the subglottic region may be seen.

Killian's method is practised in two distinct ways—either through a tracheal orifice (inferior bronchoscopy), or by the

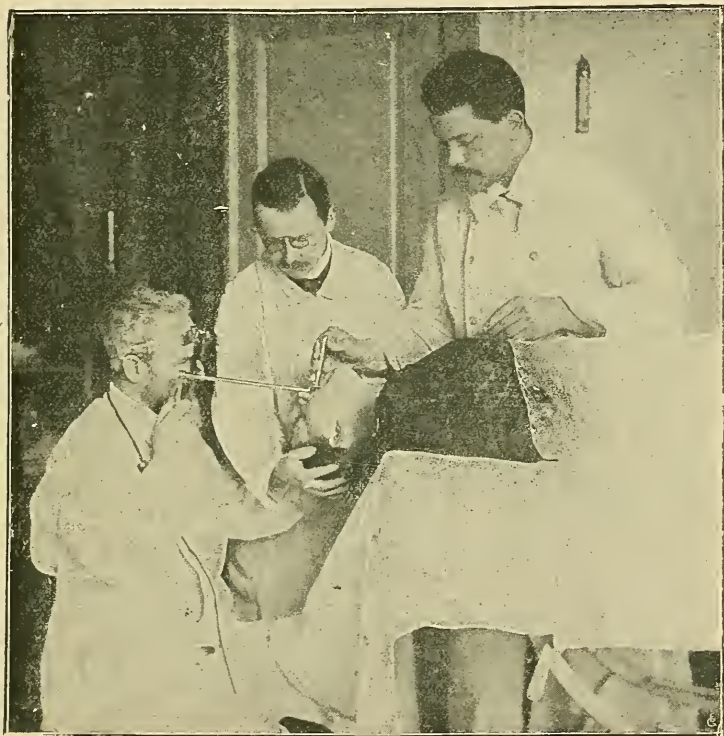


FIG. 84.—SUPERIOR TRACHEOSCOPY AND BRONCHOSCOPY. (AFTER KILLIAN.)

This figure shows the first stage in the introduction of the tube.

mouth (superior bronchoscopy). In both cases the tracheo-bronchial mucous membrane, or the laryngo-tracheo-bronchial, must be anæsthetized with cocaine solution (10 to 20 per cent.).

**Inferior Bronchoscopy** is by far the simplest and easiest method, and may be practised without narcotics—

at least, in adults—the operator being in front of the patient.

Once the tracheotomy tube is removed, the head of the patient should be thrown well backwards to straighten the tracheal passage. Then, with Killian's tracheo-bronchial tube, aided by Clar's frontal mirror, or, still better, by fixing

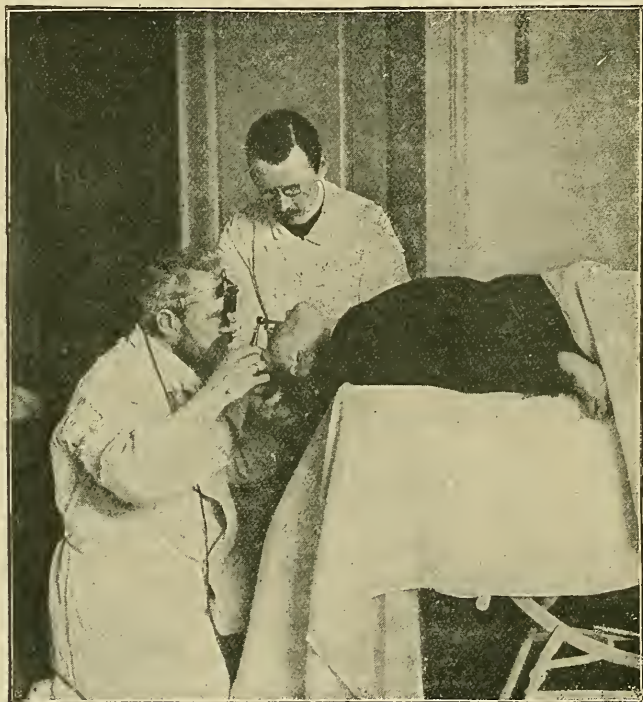


FIG. 85.—SECOND STAGE OF TRACHEOSCOPY AND BRONCHOSCOPY.  
(AFTER KILLIAN.)

The tube has penetrated to the bronchi.

it to Caspar's handle, introduce the tube, which should be warmed and coated with vaseline, into the trachea down to the bronchial bifurcation. When at this level, if it is desired to introduce the tube into the right or left bronchus, move the head of the patient in the contrary direction. The tube is then pushed gently down to the first ramification,

FIG. 86.—KILLIAN'S TUBE FOR TRACHEOSCOPY AND BRONCHOSCOPY.

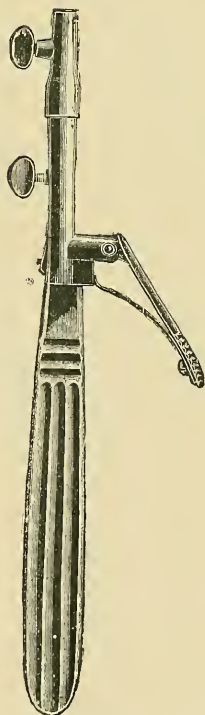
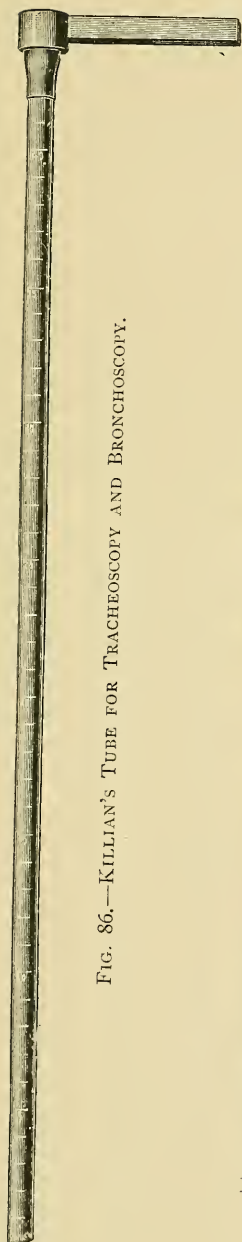


FIG. 87.—KILLIAN'S COTTON-WOOL CARRIER FOR THE TRACHEA AND THE BRONCHI.



through which it may easily pass, if it is not too large. If mucus is present, it may be removed, either by a cotton mop, or with the special pump used by Killian.

In **Superior Bronchoscopy** the patient may either sit in front of the observer after cocainization, or lie on his back under chloroform. Killian thinks, that the narcotic

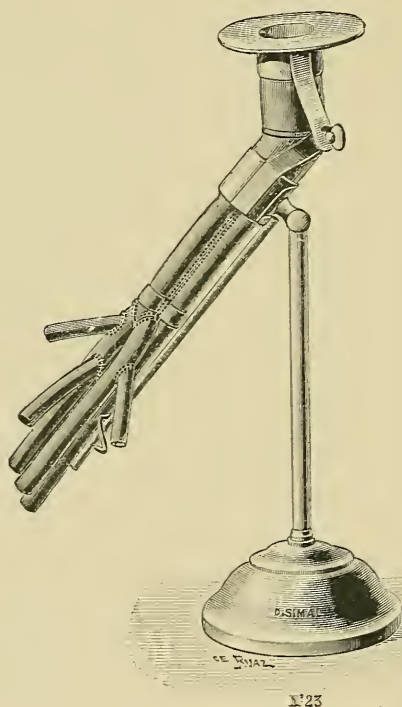


FIG. 88.—KILLIAN'S PHANTOM FOR PRACTISING BRONCHOSCOPY AND ESOPHAGOSCOPY.

has the advantage of making the muscles of the neck more relaxed, and facilitating the introduction of the tube. Once the patient is asleep, draw his head a little beyond the table and depress it. Then press the tongue down, and insinuate the tube first beyond the epiglottis, then between the vocal cords at the level of the interarytenoid, and then

penetrate into the trachea, taking advantage of the movement of inspiration. Cocaine will favour the intubation.

If the patient is not under chloroform, place him in front of the operator, with the head strongly pushed backwards, to straighten the laryngo-tracheal passage.

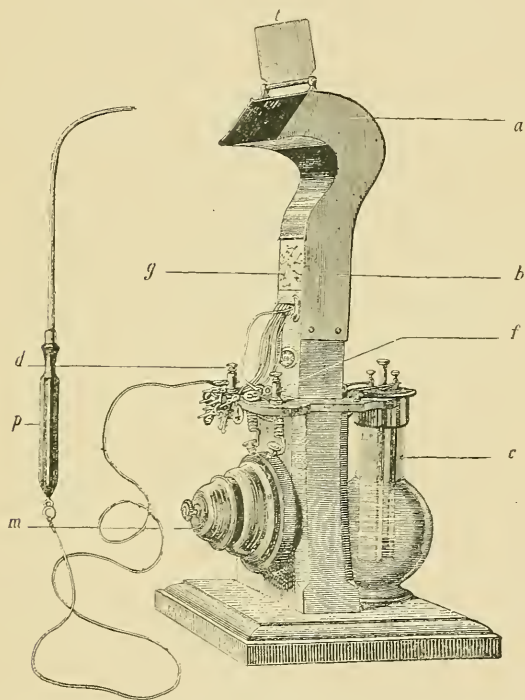


FIG. 89.—GAREL'S ELECTRIC LARYNGO-PHANTOM. (REPRODUCED FROM A NEGATIVE BY BASSOLS PRIM.)

*a, b*, Metal case, inside which is placed an artificial larynx; *c*, cell for ringing the electric bell; *d*, terminal for fixing the electric probe; *f*, terminal connecting the thread corresponding to the point to be touched; *g*, representation of the different points of the larynx possible to touch; *m*, bell ringing to indicate the result of the experiment; *p*, handle of the electric probe; *t*, cover of the metal tube.

The length and diameter of the bronchoscopic tubes vary according to different individuals. With adults Killian recommends tubes from 9 to 11 millimetres in diameter and from 16 to 25 centimetres in length for inferior broncho-

scopy, and from 20 to 35 centimetres for superior bronchoscopy. The tube must always be coated with vaseline, warmed and sterilized. It must be inserted gently under the eye of the operator. If foreign bodies are to be removed, special instruments are required. Killian has invented a bronchoscopic phantom to train beginners. The cleansing of the visible area is effected with plugs of wool, suction

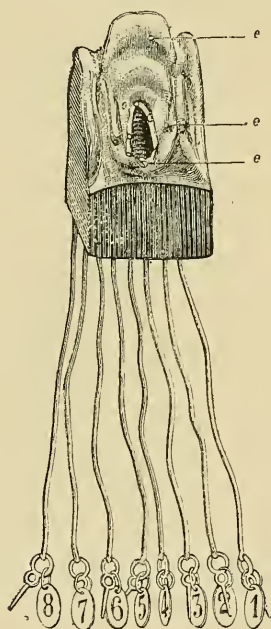


FIG. 90.—GAREL'S ELECTRIC LARYNGO-PHANTOM.

An artificial larynx furnished with eight electric conductors, each corresponding to small electric contacts scattered in different regions of the larynx.

pump, or with a bronchoscopic tube with a double orifice also invented by Killian.

### Laryngoscopic Practice.

The operator, having both hands occupied, must ask the patient himself to hold the tongue with his left hand, if the doctor is right-handed, and *vice versa*.

Some authors (Baratoux and Garel) have invented electric laryngo-phantoms for training beginners.

### Stroboscopy.

Examination with the stroboscope is used specially to observe the movements of the cords. Indeed, a vocal cord, which seems motionless on ordinary laryngoscopy, appears animated with movements perceptible with Spiess' apparatus. This instrument should therefore be used in

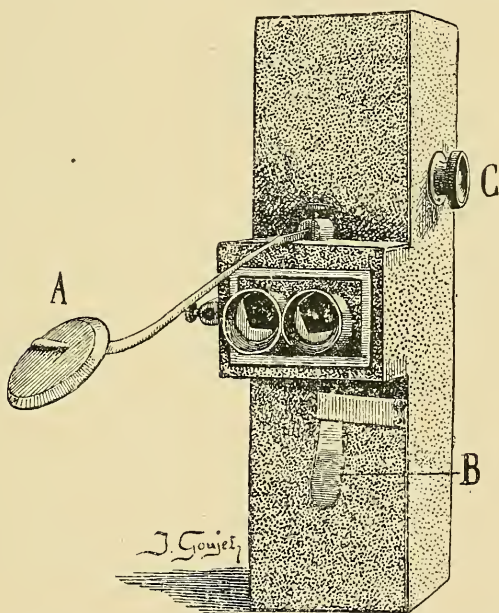


FIG. 91.—GAREL'S APPARATUS FOR PHOTOGRAPHING THE LARYNX.

A, Laryngeal mirror ; B, lever to close the shutter ; C, screw for moving the film after each pose.

cases of paralysis, to distinguish between partial and total lesions. The stroboscope, based on the same principles as the kinetoscope and cinematograph, consists of a double electric photophore placed before the eye of the observer. By the help of very simple mechanism, put in motion by an electric motor, diaphragms and orifices pass at regular intervals before the eye of the observer, and make on his retina

a series of successive images, allowing him to see the movements of the cords. The instrument emits a sound, which the patient has to reproduce, in order to make the number of the vibrations of the thyro-arytenoid folds coincide with the

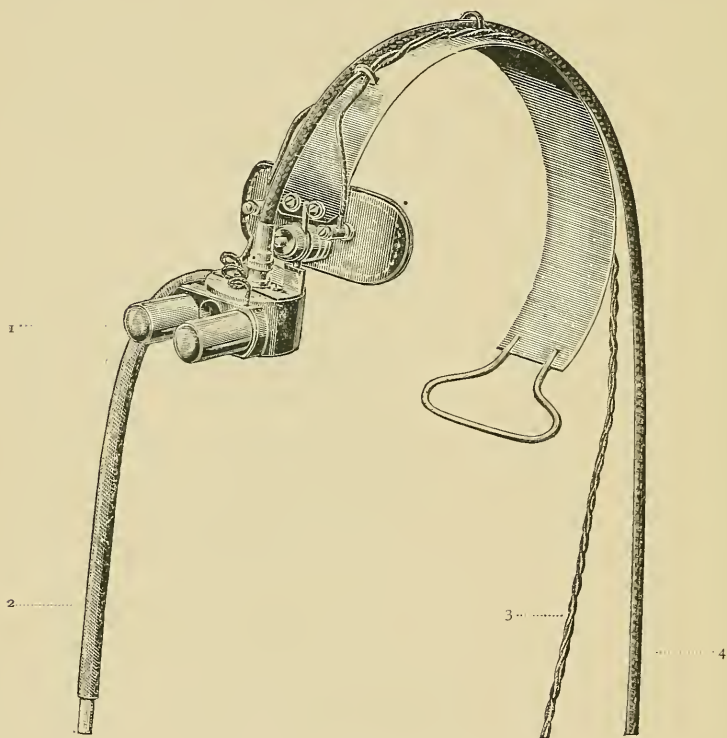


FIG. 92.—SPIESS' STROBOSCOPE.

1, Electric lamps with bull's-eyes; 2, tube to be placed in the mouth of the operator, who sounds the note; 3, electric cord; 4, tube fitted to the mechanism which moves the diaphragms.

number of the interruptions of the apparatus. As a woman's voice is an octave higher, inspection is made through a smaller aperture placed a little below the former, which renders more rapid, and consequently more numerous, the interruptions of the opaque diaphragm.



## CHAPTER II

### DISEASES AND TRAUMATISMS OF THE LARYNX

#### Circulatory Disorders.

**Anæmia** is observed chiefly in subjects debilitated by repeated hæmorrhages or general affections (chlorosis, leukæmia). It accompanies cancer, tuberculosis, Bright's disease, etc.

In bacillary affections anæmia of the pharynx and the larynx may be very early and so pronounced, that some authors insist on the immediate and careful examination of the lungs of a patient affected with this discoloration of the pharynx and larynx.

On laryngoscopic examination the soft palate, the folds, and the ventricular bands present a pale, rather yellowish coloration, with some vascular arborescence. The vocal cords have lost their smooth and shining appearance.

The diagnosis of those circulatory troubles is very simple; they are recognized only by laryngoscopic examination, functional symptoms being absent.

#### Hyperæmia—Congestion.

Laryngeal congestion appears under two forms, active and passive.

**Passive congestion**, or hyperæmia, is associated with heart disease, chronic affections of the digestive tract, or compression of the veins (*e.g.*, in the effort of vomiting or strenuous cough).

**Active congestion** is frequently the syndrome of a general affection. It occurs often during the course or at the beginning of eruptive fevers, after sudden changes of

temperature, or as the effect of cold on the throat or feet. Inhalation of irritating vapour, tobacco smoke, and alcoholism are other causes of this affection.

Vocalists especially, when they sing in a heated room or in the open, particularly at the seaside, or when they sing falsetto, or have to change their voice, are exposed to the disease in question. It occurs also among certain women before or during the period of menstruation. Sometimes it is the result of sexual excitement. There is a marked relationship between the uterus and the larynx.

Laryngeal congestion occurs also as a consequence of lesions in the nasal mucous membrane, either by direct propagation or as a reflex phenomenon. It is also a necessary symptom of voice-breaking.

It is met with in tuberculosis, naso-pharyngeal catarrhs, and chronic inflammations of the accessory cavities of the nose. It may occur after the ingestion of certain drugs, as iodide and bromide of potassium, ipecacuanha, etc.

*Symptoms.*—In slight forms symptoms may be absent. Usually functional disturbance consists in a feeling of pain, burning and tickling in the pharyngeal cavity. The cough is paroxysmal and dry.

The timbre of the voice is lowered, becoming husky and less sonorous, and vocalists, especially women, sing with difficulty and without expression. If the congestion is intense, the voice may break and stop during the production of certain notes.

The objective symptoms are similar in the active and passive forms. According to the intensity of the lesion, the coloration of the vocal mucous membrane varies from light red to a deeper hue. The ventricular bands and the posterior region of the larynx are the most severely attacked, but the cords may be affected throughout their length. Sometimes the cords are coloured throughout their whole extent. They are usually rosy or red only on their edges, and more colourless on their surface, without any trace of infiltration. The presence of paretic changes suggests inflammation rather than a simple laryngeal redness.

*Course, Duration, and Termination.*—The course of the affection is very variable. It depends on the cause and intensity of the congestion. Sometimes the disease is transitory, but often it may last for several days. The tendency to congestion being a sign of defective circulation in the larynx, it may be considered grave in the case of singers, as they are liable to lose their voice, and especially those who are husky in the morning.

*Prognosis* is generally benign, if the patient is prudent and cautious.

*Diagnosis* is usually easy, because the acute catarrhal inflammation of the vocal mucous membrane, which is somewhat analogous to laryngeal congestion, presents characteristic symptoms.

*Treatment.*—The sole treatment is rest of the organ—*i.e.*, silence. However, when the congestion is slight or transitory, a very hot foot-bath, mustard poultice at the nape of the neck, with some drops of an alcoholic tincture of aconite root suffice to dispel it. The author has often successfully ordered the following :

R	Tincture of aconite (alcoholic)	...	25 drops	℥xxv
	Bromide of potassium	...	3 grammes	gr. 45
	Compound syrup of erysinum	...	30 „	ʒvii
	Cherry-laurel water	...	10 „	ʒiiss
	Infusion of lime flowers	...	120 „	ʒiv

Two or three spoonfuls daily in a warm infusion of lime-tree flowers.

Sometimes applications of cocainized and mentholated vaseline are sufficient to make the congestion disappear.

**Laryngeal hæmorrhages** are due to the same causes as the congestion. There is only a difference of degree between the two lesions. Hæmorrhages occur, over and above, in neuropathic, hæmophilic, and arthritic patients, specially in those affected with atrophic rhino-pharyngo-laryngitis. They have been observed as supplementary hæmorrhages in women. They are not rare in malignant, or even in benign,

tumours of the larynx. The symptoms are those of congestion, but more intense, and, in addition, expectoration is sanious or bloody. The laryngoscope shows signs of an intense congestion of the vocal mucous membrane, sometimes simple vascular arborescence, sometimes ecchymosis, or even true blood cysts resulting from interstitial hæmorrhages. The latter are met with specially in singers, teachers, and others after straining the voice. In some cases laryngoscopy shows clots adherent to the cords, and even blood exuding from the mucous membrane.

Diagnosis is generally easy. The alterations of the voice, and the lesions observed, determine the seat of the bleeding.

If hæmorrhage is superficial it stops spontaneously, but if it becomes profuse, it may be checked by the external and internal application of ice, or by the galvano-cautery, or by a solution of adrenalized cocaine.

The following formula is recommended :

Rx	Solution of adrenalin (1 : 1,000)	}	1 gramme	{	℥xv
	Hydrochlorate of cocaine	}		{	gr. 15
	Cherry-laurel water	... ..	8 grammes		ʒii
	Glycerine (pure)	... ..	2 „		℥xxv

Treatment consists in checking the cause of the congestive onset. In some cases rest of the organ, slight saline purgatives; in others, physical exercise, hydrotherapy, or antispasmodics, will produce a good result. It is well to remember that a solution of concentrated cocaine (1 : 5 or 1 : 10) does not produce in some patients anæsthesia or vaso-constriction, but, on the contrary, a kind of vesication of the vocal cords.

### Burns of the Larynx.

Isolated burns on the larynx are rare. Their symptoms are respiratory disturbances through acute œdema, and dysphagia. The epiglottis and the arytenoid region are most frequently affected. The lesion varies from the appearance of slight erythema with œdematous infiltration, to that of necrosis and gangrene.

## Wounds of the Larynx.

Wounds of the larynx are accidental or surgical. The former are caused by sharp cutting objects introduced into the larynx. The mucous membrane may also be ruptured by violent coughing or retching.

*Locality.*—They may occur in the whole laryngo-tracheal tract, but are more frequent on the thyro-hyoid membrane and on the trachea.

*Symptoms* vary according to the extent and locality of the wound.

**Broad Wounds.**—If the incision is transverse, the lips of the wound will be more or less apart, according to the position of the head, and whether the anterior muscles of the neck have been severed or not. The immediate loss of blood is always alarming, and it is not rare to see the wounded person succumb from hæmorrhage.

The condition of respiration is variable. Sometimes expiration produces, as it were, a splashing of blood, and inspiration a characteristic whistling sound. If the trachea is severed, the upper portion is drawn upwards, and the inferior portion disappears downwards.

Asphyxia may result from this downward retraction of the trachea, from the flow of blood into the bronchi, or from the obstruction of the larynx by partly detached portions floating in it, or by the object itself, that caused the wound.

The voice is sometimes unaffected, but as a rule it is otherwise, especially if the wound reaches the thyro-hyoid membrane, the cords, or the arytenoid cartilages. Likewise if one of the two recurrents is affected, muscular disturbances will be produced corresponding to the mutilation.

Disturbances of deglutition vary according to the locality and extent of the lesion. A wound at the level of the thyroid cartilage causes an acute pain during the upward movement of the larynx. If the thyro-hyoid membrane is cut, the food may penetrate into the larynx. Those disturbances are consummated, when the wound implicates the vocal organ and the pharynx.



**Narrow Wounds.**—In this case subcutaneous emphysema appears, and if this is very pronounced, asphyxia ensues. It is rare that considerable hæmorrhage takes place, unless a vessel of some importance be severed. Infiltration of air and blood may cause compression of the larynx, and necessitate immediate intervention. If the cords have not been affected, vocal disturbances are nil or slight.

Laryngoscopic examination shows either considerable loss of substance, or simply ecchymosis or œdema occupying the wall of the larynx, the trachea, and even the orifice of the œsophagus. Darkish characteristic ecchymotic lesions are observed in cases of strangulation.

Those wounds are always very painful, especially on deglutition.

*Diagnosis.*—In dubious cases the emphysema, the presence of asphyxia, and subcutaneous ecchymosis afford useful indications.

*Pathological Anatomy.*—The state of the internal wound is not necessarily determined by the appearance of the external wound; for example, a small loss of substance may coincide with a severe wound of the larynx.

*Complications.*—Those wounds may be complicated by the introduction of air into the veins, emphysema, or hæmorrhage. Secondary complications consist especially in abscesses and gangrene. Sometimes the disorganization of the cartilages of the larynx is so great, that the life of the patient can only be preserved by the introduction of a canula.

*Course.*—The edges of the wound being irregular, infection may occur in spite of immediate treatment. Death may ensue from hæmorrhage, suppuration, or septicæmia. As permanent sequelæ, fistula, and laryngo or tracheal stenosis may occur.

*Treatment.*—The first step is to arrest bleeding by constriction or ligature of the bloodvessels—veins as well as arteries; then antiseptic cleansing of the wound should be carried out. If asphyxia is apprehended, a tracheal canula should be introduced, either by the wound or through an artificial opening. The application of Trendelenburg's canula

is of assistance. The torn portions of the muscles, which have no chance of being reunited, and which might induce gangrene, should be cut away. In order to avoid emphysema, the tracheal opening should not be wholly closed. The deep parts should be sutured with catgut, the head being placed in a suitable position, and antiseptic treatment applied according to the requirements of the case. If small wounds exist, with emphysema, scarification should be made, and if need be, the pretracheal and laryngeal tissues relaxed, in order to prevent the diffusion of air into the tissues.

### Fractures of the Larynx.

*Etiology.*—Those fractures are very rare, because the larynx is formed of cartilage loosely connected with the neighbouring parts, its elasticity enabling it to escape. The ordinary causes of fracture are violent pressure on both sides of the thyroid cartilage, or a sudden impact anteriorly—*e.g.*, with the hand or foot, or a carriage wheel. Fracture of the larynx is rarely brought about by hanging.

*Pathogeny.*—Fracture of the framework of the larynx is produced in two ways—by crushing or by divulsion. The former occurs more frequently, when the larynx is injured anteriorly, as it leans against the vertebral wall.

*Symptoms*—(1) *Physical Signs.*—If the fracture has occurred from a blow or violent thrust, the neck is flattened, owing to the giving way of the thyroid cartilage. On the other hand, if the fracture is due to bilateral compression, the larynx projects. Those symptoms are not to be exclusively relied upon, as swelling may conceal them. If the subject has a slender neck, with a pronounced larynx, the fracture may be felt by the finger if pressure be exercised laterally. The larynx is abnormally mobile. Some authors say, that they have felt crepitus, but this is not easily perceived. Not only may it be confused with crepitation of a normal larynx, but it is also somewhat dangerous to elicit.

In all cases where crepitation is sought for, it should be differentiated from what is normally produced by friction

of the great cornua of the thyroid cartilage against the vertebral column.

Generally, if the vocal mucosa has become involved, a certain degree of emphysema supervenes, localized on the neck, or extending to the face or upper portion of the thorax.

Laryngoscopic examination may be resorted to, and confirm the result of external examination. Direct examination, if practised not long after the accident, shows a more or less diffused ecchymosis, seated not only on the vocal organ, but often at the orifice of the air-tracts and on the pharyngeal wall and trachea. These ecchymoses may be seen exteriorly under the skin, which assumes a purple or reddish colour.

(2) *Functional Symptoms*.—The first symptom is spontaneous pain, very acute at the outset, abating rapidly, but excited by any movement of the neck, or by touch.

The gravest symptom is interference with respiration. Asphyxia may occur even immediately, and is characterized by cyanosis of the face, coldness of the skin, and small pulse. The course of the respiratory disturbances is very variable. They may be very considerable at the outset, or be gradually aggravated by swelling, by generalized œdema, or by concomitant emphysema. Some patients have been asphyxiated, even when in the process of recovery, either by the displacement of a detached fragment or by dislocation of the arytenoid cartilage.

Vocal disturbances depend on the alteration of the vocal cords. Deglutition is generally painful. The expectoration is usually blood-streaked, and becomes purulent and fetid.

*Diagnosis*.—The existence of fractures of the larynx is sometimes easily diagnosed, but it is difficult to determine their nature by the functional symptoms. Laryngoscopy and radiography will greatly assist. Blood-stained expectoration, and specially infiltration of air into the tissue, are significant symptoms.

*Pathological Anatomy*.—The larynx is composed of four chief parts—two odd (the cricoid and the thyroid) and one pair (the arytenoids).

The fracture of the cricoid may be situate either posteriorly, laterally, or anteriorly. The line of the fracture is generally vertical or slightly oblique throughout the cartilage. If there is only one, it is usually posterior; if there are many, they may occupy any part of the cricoid. Fractures of the thyroid, even though deep, may extend throughout its whole length. They may be rectilinear, vertical or oblique, or like an **S**. Complete fractures are the most common, but their site is variable. Sometimes the horns are detached; sometimes one of the laminae has been divided.

There may be only one lesion, but often several comminuted fractures are seen, when the cartilage is crushed. Simple fractures of the thyroid are of a fairly regular type.

The soft parts are affected in different ways. The perichondrium is sometimes unaffected, but at other times it may be injured internally and externally. The laryngeal mucous membrane and muscles may be contused and even lacerated, this favouring the occurrence of emphysema. If the wound is the result of great violence, the hyoid, trachea, œsophagus, inferior maxilla, and the clavicle may be implicated.

*Course—Prognosis.*—The traumatism may heal in two ways. If the framework of the larynx is still cartilaginous, the fragments are united by new cartilaginous or osseous tissue; but should the cartilage be ossified, healing is similar to that of long bones. If suppuration occurs in the region of the wound, consolidation may be retarded or entirely prevented. If the evacuation of the pus is rapid, reparation is simply impeded; if, on the other hand, the purulent process persists, caries and necrosis may ensue.

Prognosis varies according to the importance of the lesion, its extent, and the time of intervention. Generally it is extremely grave. Twelve to fifteen per cent. of the patients survive. Lesions of the cricoid are the gravest, as they produce rapid asphyxia. When healing occurs, prognosis is not always favourable, because the wound may result in stenosis, and necessitate the use of a permanent canula.

*Treatment.*—The greatest danger being asphyxia, the sole effective treatment is tracheotomy, especially when the glottic

orifice is stenosed, or if defective union has taken place, interfering with respiration.

### Acute Catarrhal Laryngitis.

An acute catarrh of the laryngeal mucous membrane.

*Etiology.*—The chief causes are chills acting directly on the neck, or indirectly—*e.g.*, cold feet, etc.

Those acute inflammations are frequent in people accustomed to use mufflers, respirators, or in those exposed to irritating vapours, such as tobacco, the drinking of hot liquids, etc.

Laryngitis is consequent on coryza, acute angina or tracheitis, alcoholic or sexual excess. It often occurs at the beginning of certain eruptive fevers, as measles, scarlatina, etc. It is frequent in people affected by rheumatism or living a sedentary life.

*Symptoms.*—General symptoms are slightly pronounced or even wanting. Functional symptoms, on the contrary, are very important. They are characterized by a feeling of heat in the throat.

During respiration the patient experiences a burning sensation from the cold air impinging on the laryngeal mucosa, so that he breathes through the nose. The cough is dry, short, and sometimes spasmodic, usually with little or no pain, sometimes accompanied by painful racking.

Secretion is absent at the beginning, but appears when the inflammation has reached the trachea, and is then viscous or purulent and thick, being sometimes in acute forms streaked with blood. The voice is slightly affected, if the irritation is in the vestibule of the larynx; on the contrary, it becomes dull, raucous, or aphonic, if the inflammation affects the cords.

In light forms respiration is not interfered with. Glottic spasm is characteristic of the subglottic form particular to children.

*Examination of the Larynx.*—At the beginning a diffuse hyperæmia of the whole vocal mucosa is observed, not only on the posterior surface of the operculum of the glottis, but also on the ventricular bands, arytenoids, and the true cords.



The latter are of a more or less intense rosy colour. Their surfaces appear uneven and rough. In certain cases the redness is not diffused, but occurs in patches. At other times the vocal cords, especially in cases of alcoholism, are somewhat swollen.

Some greyish opalescent erosions, surrounded by a red inflamed reticulum, and even superficial ulcerations, may

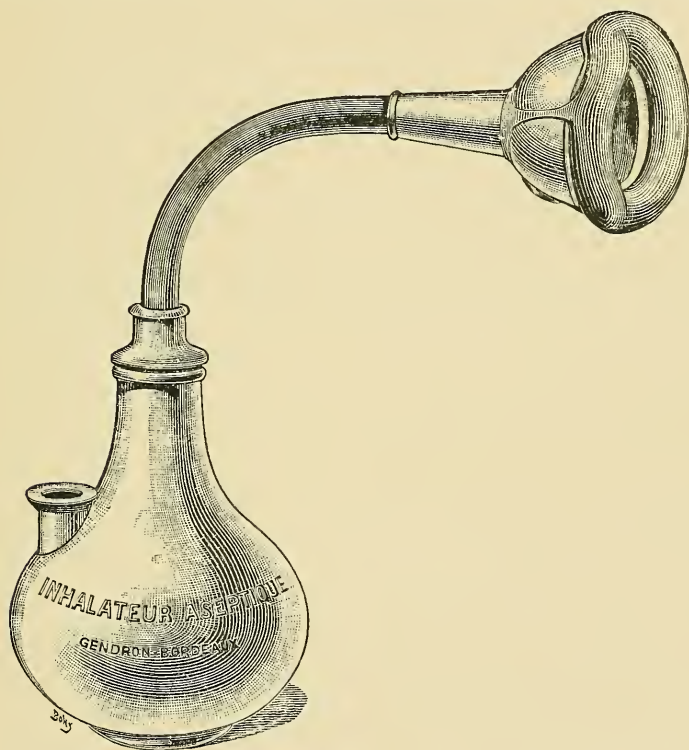


FIG. 93.—STERILIZABLE ASEPTIC INHALER, WITH DOUBLE SET OF VALVES.  
(DR. MOURE.)

be observed occupying the posterior part of the cords on their inner edge, their superior surface, or the free edge towards the anterior third. The author has seen in some arthritic people true rhagades, with thickening of the interarytenoid mucous membrane, which then appeared mammillated, of a bright red colour, and often covered with viscous

secretion. The thyro-arytenoideus and the ary-arytenoideus muscles may be affected, and so produce loss of parallelism of the cords during phonation. Those muscles are specially liable to be attacked on account of their exposed position.

*Course and Duration.*—This disease has usually a regular course. It attains its maximum intensity on the second or third day, and gradually diminishes and disappears between eight and twelve days, unless the disease becomes chronic. In smokers and singers laryngitis may last for weeks.

*Diagnosis* is usually easy. Anamnesis, subjective and objective symptoms, render diagnosis precise, even differentiating the disease from laryngitis caused by influenza.

*Prognosis* is benign in the case of adults, a cure being the rule; but, in singers and speakers, the voice may be so

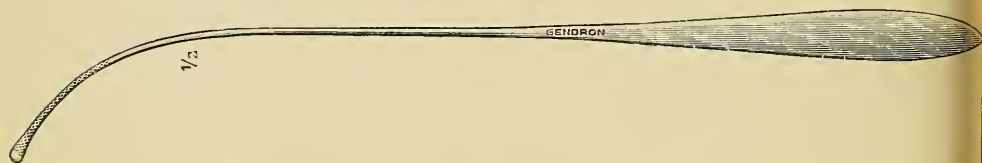


FIG. 94.—KILLIAN'S LARYNGEAL COTTON-WOOL HOLDER.

changed, as to hinder them for a long time from performing their work.

*Treatment.*—In grave cases absolute rest of the organ is imperative. The patient should keep indoors at a temperature of 15 to 20° C. Beverages and inhalations and warm compresses are recommended. Emollient inhalations may be prescribed, as follows :

R	Menthol powder	}	...	āā	5 grammes	āā gr. 75
	Balsam of Peru					
	Tincture of eucalyptus		...	250	,,	3viii

Those inhalations are made once or twice daily for three or five minutes.

It is preferable not to use too hot water, which, from excessive evaporation, might cause coughing. Usually the patient soon becomes accustomed to this form of medication, and can use even boiling water. He is recommended to

employ a cone of thickish paper placed above the boiling water, so as to inhale through the nose and mouth. The eyes should be kept out of the range of the mentholized steam.

A satisfactory result may be obtained from—

R Tincture of aconite root (alcohol) ...	1 gramme	℥xv
Bromide of potassium or salicylate of soda ... ..	2 grammes	gr. 30
Benzoate of soda ... ..	4 „	gr. 60
Syrup of krameria ... ..	30 „	ʒvii
Cherry-laurel water ... ..	10 „	ʒiiss
Lime-tree flower decoction ...	120 „	ʒiv

Three or four tablespoonfuls daily in a warm infusion.

Local intervention must be avoided during the acute period of the laryngitis. If the latter occurs at the period of menstruation, no local application should be made as long as the duration of the flow continues.

When the acute phenomena are almost over—say in about ten or twelve days—the larynx may be painted with a solution of zinc of chloride (1 : 50 or 1 : 100).

If the laryngitis frequently recurs, the nasal fossæ, the accessory cavities, or the naso-pharynx should be examined, to find out if a cause exists for the recurrence.

### Rupture of the Thyro-arytenoideus.

*Etiology.*—The usual cause of those ruptures, which are always unilateral, is excessive vocal effort during fatigue or huskiness of the voice.

*Symptoms.*—The chief symptom is the suddenness of the attack, the patient feeling all at once an acute pain in one side of the larynx, followed by dulness of the voice. Sometimes he may be unable to speak. The pain disappears quickly, but the vocal disturbances remain as pronounced as ever.

Laryngoscopic examination, if made early, shows that the affected cord is the seat of a violent hæmorrhage, and is swollen to three or four times its normal bulk. Its entire

surface is irregular and congested, resembling the lesion described as chorditis tuberosa. The ventricular bands and the subglottic region are intact. Adduction of the vocal cords is unaffected, and the lesion disappears in a month at least. The cord gradually resumes its normal volume, but remains red, finally becoming greyish and dull.

In the case of a singer, the voice may remain broken, become fatigued, and may lose something of its timbre.

Speakers may, after several months' rest and treatment, recover.

*Prognosis* is grave only in singers and alcoholic patients, or in those who are compelled to use their voice during the illness.

*Pathological Anatomy.*—The author thinks, that the milder forms are due to the rupture of a vein, whereas the graver forms are caused by the rupture of some of the fibres of the thyro-arytenoideus.

*Diagnosis* rests on the sudden appearance of the affection. In grave cases after resolution a small notch is seen on the affected cord.

*Treatment.*—Rest to the organ is the main consideration. Hot fomentations and inhalations will be of good service. Some time after the accident the vocal cord may be lightly brushed with zinc chloride or nitrate of silver (1:50 or 1:30). At the second period—*i.e.*, fifteen to twenty-five days after the accident—inhalations should be replaced by the spray.

### Epiglottitis.

An acute inflammation of the laryngeal mucous membrane restricted to the epiglottis.

*Etiology.*—In addition to the usual causes of acute laryngitis, ingestion of too hot, caustic, or irritating liquids (soda, potash, etc.) may produce this lesion.

*Symptoms.*—The functional symptoms are much more intense than in simple laryngitis. The sensation of the presence of a foreign body in the throat is rapidly felt. Pressure on the larynx is painful, as are the movements of

deglutition and phonation. In grave cases pain extends to the ears. Respiration is not interfered with, unless the epiglottis is so markedly congested and œdematous, as to obstruct the laryngeal orifice. Laryngoscopy shows generally on the lingual surface of the epiglottis a red or whitish red globular projection. Its surface is irregular, slightly granular, and in such cases the pre-epiglottic tonsil is often involved.

*Diagnosis.*—This lesion might be mistaken for one produced by a traumatism—*e.g.*, a needle, etc.—but the appearance and origin of the lesion are sufficient to make a clear diagnosis.

*Treatment.*—This is the same as in laryngitis, but in this case gargles are of assistance. The patient should pronounce the syllables ‘gloo-gloo,’ so that the fluid may reach the epiglottis. Sedative remedies, the formulæ of which have been already given, are recommended. If there be much œdema present, the epiglottis should be scarified by means of the galvano-cautery, or by cutting a part of its surface with Moritz-Schmidt’s or Gougenheim’s forceps. If respiration is embarrassed, tracheotomy should be performed.

### Aphthous Laryngitis.

Aphthæ are fairly common in the mouth, on the gums, tongue, lips, cheeks, and even on the uvula and soft palate. In some cases they have been observed on the tonsils, the pillars, and even on the mucous membrane of the rest of the digestive tract.

*Etiology.*—This eruption is similar to aphthous stomatitis, and is caused by the ingestion of spiced or unsound food, tainted fish, etc. The larynx is infected through auto-inoculation, the saliva being the medium of infection.

*Symptoms.*—The chief symptom is intense pain on deglutition, most marked with the saliva or spiced food. In children the pain is so acute, that they refuse to take food. Usually no general symptoms exist. The lesion of the larynx is frequently accompanied by similar aphthæ in the buccal cavity. The aphthæ, two or three at most, present the usual appearance.



At the outset they are greyish ovular spots, surrounded by a very red border, without peripheral infiltration. They generally occur on the edges of the epiglottis, the glosso-epiglottic folds, and even the aryepiglottic folds or arytenoid region.

*Diagnosis.*—The mucous patches of syphilitic laryngitis are equally superficial and opaline, but much more irregular in their form, and, above all, much less painful. Herpes is differentiated by a violent attack of fever, larger, more erosive, and more numerous spots. Moreover, it usually develops at the same time on the soft palate, the pillars, and often even on the lips. Pemphigus, presenting sharp characteristics, can hardly be confounded with aphthous laryngitis.

*Treatment* consists in carefully avoiding all irritating food. An alkaline diet should be prescribed. If dysphagia is too intense, relief may be derived by applying to the eroded parts some fused nitrate of silver on the *porte-caustique*.

Dysphagia may be modified by alkaline and cocainized gargles, or by the insufflation of orthoform.

### Acute Œdematous Laryngitis.

**Primary Œdema**—*Etiology.*—The chief cause is cold. Excessive use of the voice, ingestion of boiling liquids, and the introduction of foreign bodies, also produce this inflammatory lesion. External traumatism, operations on the larynx from without, applications of concentrated solutions of cocaine or adrenaline, or even absorption of certain remedies, such as iodide of potassium, may produce acute serous suffusions of the larynx. This affection appears to be more frequent in men, and at middle age.

**Secondary Œdema** may be consequent on lesions of the neighbouring parts or of distant organs. It appears also after acute angina, and tuberculous or syphilitic ulcerations of the larynx. It often accompanies Ludwig's angina, furunculosis, and anthrax in this region, and is observed in certain inflammations of the vertebral column, and in aneurisms of the aorta.

Erysipelas appears fairly often in the larynx. Œdema is met with as a complication of laryngitis, due to influenza, also in Bright's disease, pyæmia, ulcerative endocarditis, and even in some lesions of the right side of the heart.

*Symptoms.*—Acute œdema of the larynx gives rise to many symptoms. The most manifest are disturbances of the voice, which in most cases is husky, without resonance, or even aphonia. Pain is absent, except for the sensation of a foreign body. Deglutition is sometimes interfered with. The most prominent symptom consists in respiratory disturbance. Sibilant, or at least loud inspiration, with free expiration, occurs only when the œdema is seated in the vestibule of the larynx, and particularly in the aryepiglottic folds and in the epiglottis itself. Inspiration and expiration are usually affected, producing, as it were, guttural snoring. If the serous exudation is very pronounced and rapid, attacks of choking frequently occur. Only then do we have the symptoms of glottic œdema: the patient cyanosed, his face livid or blackish, eyes haggard, sits up in his bed struggling for breath. This lesion is, however, exceptional, only occurring when the œdema has been produced very rapidly, and has developed to an excessive extent, closing the laryngeal aperture. General symptoms, as fever, headache, etc., are absolutely wanting.

Examination shows a partial or total deformity of the epiglottis, which appears rounded and sausage-like, and may become sufficiently large to almost close the aperture of the larynx. If the aryepiglottic folds alone are affected, as usually occurs, they appear as two pyriform slightly rounded masses, with smooth greyish surfaces resembling fish sounds, and are of various sizes up to the dimension of the thumb, and move with each effort of inspiration.

According to Gougenheim, however, respiratory difficulty is due, not to the aspiration of those swollen bodies, but rather to the immobility of the crico-arytenoid articulation.

Sometimes the œdema is unilateral, and in some rare cases the surface, instead of being greyish, is of a uniform bright-red colour.

If the œdema has extended to the ventricular bands, which is very rare, the latter appear as two reddish folds, of a deeper coloration than the aryepiglottic folds, and partly cover the vocal cords.

The ventricular bands, although healthy, may appear swollen, owing to the efforts of the patient to speak. In such a case the condition of this organ can only be seen during respiration.

When serous infiltration occurs on the vocal cords, they assume a dirty grey colloid appearance; their bulk is double or treble the normal size, and they come in contact anteriorly. In such a case the affection may invade even the subglottic

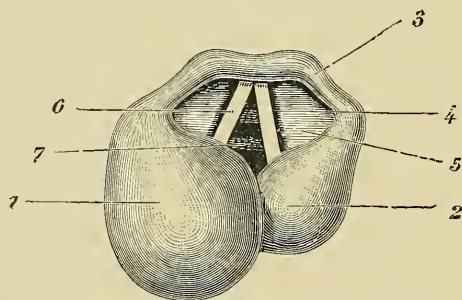


FIG. 95.—ACUTE ŒDEMA OF THE ARYEPIGLOTTIC FOLDS. (MOURE.)

1, 2, Œdematous aryepiglottic folds; 3, epiglottis; 4, ventricle;  
5, ventricular band; 6, vocal cord; 7, trachea.

region, more or less immobilize the arytenoids, and thus considerably interfere with respiration.

*Course.*—The course of acute œdematous laryngitis is very variable. Sometimes it is extraordinarily rapid. At other times the œdema progresses by successive attacks, and lasts from eight to fifteen days, unless complications occur. As a rule, the disease terminates by resolution; at other times by an abscess or phlegmon. This is rare.

*Prognosis* is serious, because a fatal issue is always to be dreaded, if the inflammation cannot be stopped, or if it occurs so rapidly, that immediate intervention is impossible. If, on the contrary, the affection is slow, the patient may bear a considerable amount of constriction.

*Pathological Anatomy.*—The seat of the serous exudation is variable. It occupies preferably the parts of the larynx where the cellular tissue is loose.

*Diagnosis* has been simplified by laryngoscopy, which reveals the nature of the disease, and differentiates it at once from paralysis or tumour. The acute affection may be distinguished from a secondary œdema by the course of the disease, and, if need be, by interrogation of the patient. Diphtheria is easily recognizable by false membrane in the pharynx or larynx.

*Treatment* consists in prescribing saline laxatives, as sulphate of soda or magnesia. If the patient is strong,

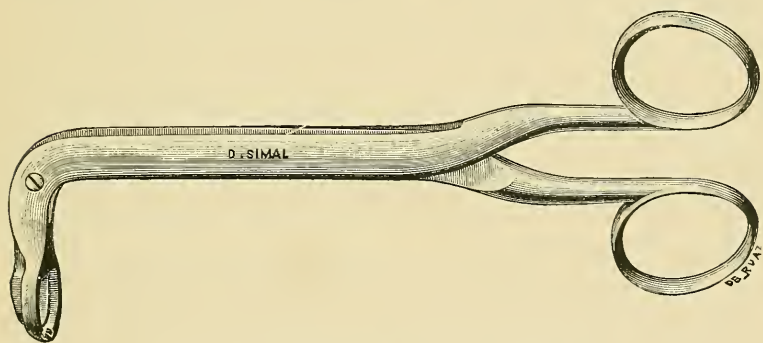


FIG. 96.—MORITZ-SCHMIDT'S PUNCH FORCEPS.

leeches may be applied to each side of the larynx. Warm poultices, foot-baths with mustard, ice administered internally or externally, cold drinks, and aromatic or antiseptic inhalations, are also excellent remedies. Subcutaneous injections of pilocarpin may be tried, or spraying locally with cocaine (1 : 10) or adrenalin (1 : 5,000 or 1 : 10,000). When possible, local scarification, or, better still, the excision of œdematized mucous membrane, should be practised. If those remedies fail, and the life of the patient is endangered, tracheotomy should be resorted to. Intubation of the glottis is a difficult and dangerous operation. Moreover, if the patient has an onset of cough, the tube may be displaced and cause death. While performing tracheotomy,

syncope may take place, especially if the patient has had for some time difficulty in breathing, or if he is in the crisis of asphyxia (*asphyxie blanche*) at the time of operation. In such cases the operation must be continued without fear and rapidly. Then, as soon as the canula is in position, the trachea should be tickled with a feather, or artificial respiration practised. In the case of children, the canula should not be removed before laryngoscopic examination has shown, that the larynx has resumed its normal permeability.

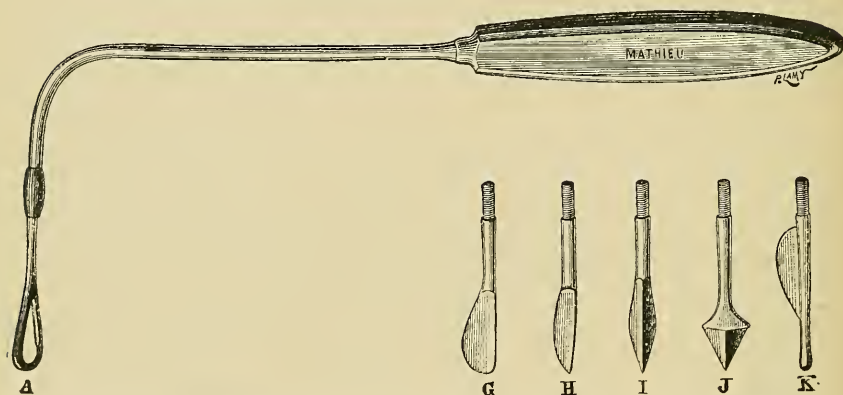


FIG. 97.—DR. HERING'S INSTRUMENTS FOR CURETTING AND OPENING OF ABSCESES OF THE LARYNX.

G, H, Bistouries ; I, J, K, Curettes.

## Acute Infantile Laryngitis.

### STRIDULANT AND INFLAMMATORY FORMS.

*Etiology.*—Laryngismus stridulus is observed specially in children from two to seven years of age, and is still known as false croup. It is due to dentition, the presence of intestinal worms, naso-pharyngeal lesions, stomachic troubles, and eruptive fevers. Dr. Ruault thinks, that heredity has something to do with the etiology of this disease, the real cause of which is the narrowness of the glottic aperture and the peculiar sensibility of the laryngeal mucous membrane.

*Symptoms.*—It appears in two distinct forms. The first begins with a slight malaise and huskiness occurring



during the daytime or towards the evening, but abruptly during the night, between eleven and one o'clock. The child awakens and breathes with difficulty, gasping for breath. His face is congested, and his eyes project, expressive of fear or anguish. Breathing is of a sibilant and stridulous nature, and the cough is sonorous and croup-like. In many cases the cough seems to be very dry. The onset lasts for some minutes, or even for quarter of an hour or half an hour, and may occur several times in a night. The child sleeps again, and awakens the morning after quite gay and happy. Sometimes the voice may remain husky for some days.

The diagnosis between simple laryngeal spasm and acute infantile catarrhal laryngitis is based on the functional symptoms, which follow the attack. Frequently, in children predisposed to laryngismus stridulus, there is observed the evening before some malaise and slight huskiness, a true catarrhal laryngitis, which becomes aggravated during the night, and is accompanied by characteristic spasms. In other cases snuffling (*enchifrènement*) exists in a more or less marked form, and the child is not so quiet as usual during sleep. He breathes with difficulty through the nose, and then awakens with a start, a victim to those suffocative spasms. Simple acute inflammatory laryngitis begins with slight fever and catarrhal symptoms. Only after two or three days do the attacks appear, which may even occur in the daytime, but in an attenuated form. The crises of suffocation are longer than in a simple nocturnal spasm. Anguish and dyspnœa are more pronounced and persistent, the pulse is frequent, the face congested and covered with perspiration; the voice remains feeble and low. If the child can speak, he complains of burning and tingling sensations in the throat at the level of the larynx. The affection lasts for eight or ten days, then the cough becomes thick, owing to expectoration, or at least laryngo-tracheal secretion. In graver cases of laryngitis the crisis of suffocation at the onset of the disease persists violently and continuously, and the breathing is stertorous and laboured.

At every moment the child seems on the point of being

asphyxiated. He is voiceless and covered with perspiration. This grave condition continues from twenty-four to forty-eight hours, and even beyond that, necessitating tracheotomy or temporary intubation of the larynx. This must be done without hesitation, otherwise death may occur.

Laryngoscopy in the case of a simple spasmodic laryngitis shows a mere redness of the laryngeal vestibule and of the vocal mucosa.

On the contrary, in acute suffocative laryngitis, there are seen not only diffuse hyperæmia, but a true tumefaction of the subglottic mucosa, which forms beneath the red inflamed cords a projecting fold overlapping their free edges.

To these material lesions is added a spasmodic condition, which fixes the arytenoids in a medial position and aggravates dyspnœa. As soon as the muscular spasm gives way respiratory disturbances slowly disappear, although the infiltration persists. Bacteriological examination sometimes reveals the existence of the Loeffler bacilli, but is usually negative. Adenoiditis frequently accompanies this form of laryngitis.

*Mechanism of the Attack.*—According to Nyemeyer and Morell Mackenzie, dyspnœa is due to accumulation in the larynx of secretions, drying up and narrowing the glottic orifice. According to Krisabert and Peters, it is in consequence of prior respiratory disturbances, preventing complete oxygenation from taking place. Ruault is of opinion, that those attacks are due to crises of glottic and tracheo-bronchic spasm, produced by local irritation of the laryngeal mucosa. If they occur specially during the night, according to him, it is owing to the congestion of the parts being increased by decubitus. The author is inclined to think, that nasal catarrh, compelling the child to breathe through the mouth, causes not only the dryness of the pharyngeal cavity, but also the laryngeal spasm. The fact is often observed in adults after tumefaction or irritation of the pituitary mucosa. Besides, the pathogeny of the affection varies according to the form of the malady—whether violent laryngeal spasm, simple or subglottic true inflammatory laryngitis, with redness, swell-

ing, infiltration, and immobility of the arytenoids. The existence of voluminous adenoid vegetations certainly gives rise to strident onsets.

*Course, Duration, and Termination.*—The course of laryngismus stridulus is quite irregular. The disease may occur once or twice and then disappear entirely. In other cases the child remains for several years subject to those crises, which are renewed on the least cause. Very often it disappears after the removal of adenoid vegetations. Subglottic laryngitis progresses as an acute catarrhal inflammation. Very often the nocturnal spasm is the first symptom of a graver affection of the respiratory tract—bronchitis or broncho-pneumonia. Apart from very rare cases a cure results.

On the other hand, asphyxia may occur in the true inflammatory forms. Death then ensues from syncope or increasing dyspnœa.

*Diagnosis* is easily made. The occurrence of the onset, its abruptness, its manner of disappearing, and finally the age of the child, help to determine the nature of the disease. Laryngoscopy alone shows, whether it is a case of a spasmodic attack due to an inflammation of the vocal mucosa. The persistence of the dyspnœa after the first onset, the stertorous and laboured breathing during inspiration and expiration, with or without alteration of the voice in the absence of false membrane or adenoiditis, would point to infraglottic laryngitis.

The introduction of a foreign body into the air tract may resemble a crisis of grave laryngitis. Should interrogation and examination of the patient fail, radiography would clear up the diagnosis. Moreover, the attack would more likely occur during the day.

*Treatment.*—In a crisis of laryngismus stridulus a sponge well soaked with warm water should be applied to the front of the neck, and revulsion towards the lower extremities made. If the child is reasonable, he may be commanded to hold in his breath, and then breathe gently through the nose. This is a fairly sure and rapid way of alleviating spasm. Steam,

slightly mixed with tincture of mentholated eucalyptus and carbolic acid, also produces relief. After the crisis the patient may be treated as in simple catarrhal laryngitis. In many cases introduction of powders containing cocaine, or preferably of cocainized vaseline, into the nose, will stop nasal turgescence. The following formula may be employed :

R Hydrochloride of cocaine	5 to 15 centigrammes (according to the age of the child)	gr. 3 to 9
Powdered menthol	5 to 10 centigrammes	gr. 3 to 6
Boric acid ...	1 to 2 grammes	ʒi to ii
Vaseline ...	15 grammes	ʒii

Put a pellet of this, the size of a pea, in each nostril, morning and evening, and let the patient inhale strongly.

If those crises are due to a known cause, as dentition, intestinal worms, adenoid vegetations, those lesions must be first treated. Finally, in grave cases recourse should be had to artificial respiration, inhalation of oxygen, and even to tracheotomy ; but intubation, if possible, is preferable.

### Influenzal Laryngitis.

Laryngeal complications developing in the course of the general disease known as la grippe or influenza.

*Etiology.*—Influenza or la grippe seems to develop preferably in cold and wet weather, but appears in all climates and at all seasons.

*Symptoms.*—Local symptoms vary, according as the malady presents catarrhal, infiltro-œdematous, ulcerous, or myopathic forms.

(a) *Catarrhal Form.*—In the catarrhal form the symptoms are a sensation of dryness, burning, and of titillation in the throat, which provokes onsets of dry cough, or simple hemming. In graver forms respiration becomes slightly painful, more in consequence of nasal turgescence than of laryngeal lesions. The expectoration, nil at the beginning, becomes later mucoid, or muco-purulent. The voice is dull and

broken. Laryngoscopic examination usually shows redness, extending over the whole larynx. The epiglottis is of a rosy colour; the aryepiglottic folds, the ventricular bands, and the interarytenoid region are sometimes slightly swollen. The cords, covered with viscid secretions, are rosy, or even red, and erythematous. More frequently they are merely rough, owing to submucous suffusion. In some cases the vocal cords are intensely red, with diffuse epithelial desquamation, showing small bleeding-points.

Paretic lesions are similar to those observed in acute catarrhal laryngitis.

(b) *Infiltra-œdematous Form.*—This may present two different varieties, the one being characterized by a sensation of burning in the pharyngeal cavity, but specially by a true painful dysphagia. On deglutition the patient feels stinging pains in the throat, with a true sensation of suffocation, the pain being more pronounced towards evening and during the night. Phonation is equally painful, and the larynx is sometimes very sensitive to the touch. Laryngoscopic examination shows a characteristic very pronounced œdematous infiltration

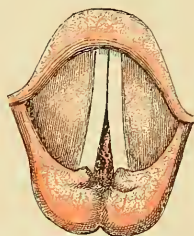


FIG. 98.—INFLUENZAL LARYNGITIS (INFILTRIO-ŒDEMATOUS FORM). (DRAWN FROM NATURE.)

The arytenoid region is red, and infiltrated posteriorly towards the entrance of the œsophagus.

of the posterior region of the larynx. The mucous membrane, which covers the arytenoids, is not only red but infiltrated, and projects at the orifice of the œsophagus. This lesion resembles a bacillary laryngitis at the period of infiltration. The cords are red and rough, as in the preceding form. In other cases serous infiltration of the aryepiglottic folds is observed, with slight swelling posteriorly. Those manifestations are much less painful than in the above variety (Fig. 98). In tuberculous people, or in those affected with former lesions in the larynx, influenza may cause those rapid infiltrations which give rise to



suffocation, and necessitate immediate opening of the air passages.

(c) *Ulcerative Form*.—Everyone now admits that ulceration of the laryngo-mucous membrane may be caused by influenza, and occurs specially in those patients whose power of resistance is small, such as in tuberculous, syphilitic, and herpetic subjects.

In mild forms examination with the mirror shows small erosions, covered with a greyish-white exudation, bounded by a reddish margin, standing out on the vocal cord, which is more or less rough and rosy. When those lesions are superficial, they can only be seen by a strong light. If, later on, the primary desquamation is replaced by true ulceration, the edges of these ulcers are sharply defined, and formed by an inflamed mucosa slightly red, and projecting with a flattened surface, the centre of which is excavated. The ulcer is covered with a greyish pultaceous and slightly adherent coating. Those alterations are usually on the edges of the vocal cords, either anteriorly or on the posterior third. The author has seen them occupying the whole cord, but he has never met them on the ventricular bands, nor in the arytenoid region.

Usually those losses of substance are symmetrical, but appear on each side at a different stage. Vocal disturbances are never absent, and are generally very pronounced.

(d) *Myopathic Form*.—Absence of parallelism and of tension of the vocal cords, caused by irregular contractions of the muscular fibres affected with inflammation of the subjacent mucous membrane, cannot be described as paralysis. Those cases are comparatively rare in influenza, and are tractable to ordinary remedial measures.

Spasms of the glottis are observed in the bulbar form of the disease. More or less abrupt interruptions of the respiratory functions are occasionally observed. Frequently nervous spasmodic coughing occurs, the cause of which cannot be ascertained by auscultation or percussion. This cough cannot be stopped by any known sedative treatment; but a simple cauterization of the mucous membrane of the

inferior or middle turbinals, or the introduction into the nasal fossæ of cocainized vaseline (1 : 30), may moderate its intensity.

*Diagnosis.*—The diagnosis is usually based on the general symptoms and the environment of the subject, more than on the lesions themselves, which occur in almost all diseases of the larynx.

*Prognosis* is generally benign, but erythema may follow and cause disturbances, which may endanger the larynx itself. Recurrences are very frequent after apparent cure. Simple erosions disappear fairly rapidly, but ulcerations may resist regular treatment for months.

Influenza may be the source of another kind of disease (bacillosis), which may be recognized by the persistency of the malady and the aggravation of the local symptoms.

*Treatment.*—Warm and emollient drinks, bromide of potassium and aconite, opiates administered internally, usually abate the catarrhal onset.

Later on, local treatment, varying according to the degree of irritation, should be applied. In merely catarrhal, erythematous, and even infiltro-œdematous forms, warm inhalations and cocainized gargles, with rest, will be sufficient to dispel the local manifestations. Quinine may be administered internally, according to the age of the patient and the degree of the infection.

If the œdema is too great, it should be treated as an œdematous laryngitis. If the erythema is protracted beyond the usual limit, or if erosions or ulcerations exist, the spray should be used, twice or thrice daily, for three or five minutes, according to the following formula :

℞ Hydrochloride of			
cocaine ...	...	25 to 50 centigrammes	gr. 4 to 8
Solution of adrenalin			
(1 in 1,000) ...	...	5 grammes	℥ lxxv
Antipyrin ...	...	4 „	gr. 60
Glycerine	} āā	50 „	{ 5xi
Cherry-laurel water			
Sterilized water ...	400	„	5xiv

The vocal mucosa should be brushed once or twice weekly with a solution of zinc chloride or silver nitrate (1 : 100, or 1 : 50, or even 1 : 30). In some recalcitrant cases a course of waters (sulphurous or arsenical) would be beneficial.

Paralysis should be treated with electricity, either extra- or intralaryngeally, and congestive onsets with ice or leeches. If respiration is too much impeded, scarifications, or even tracheotomy, should be resorted to.

### Herpetic Laryngitis.

*Etiology.*—This disease is very rarely met with. It is due to cold, and very often coincides with herpetic angina.

*Symptoms.*—Herpes of the larynx is accompanied by the other manifestations of herpetic fever. It is ushered in by shivering, elevation of temperature, general fatigue, malaise, even vomiting and headache, with coated tongue. Most frequently the mouth, the lips, and the soft palate are involved, but the herpes may develop on the larynx alone.

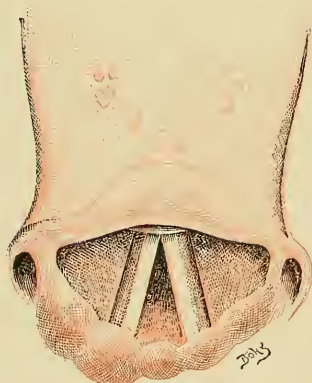


FIG. 99.

Functional disturbances consist of slight pain on deglutition, which becomes almost

always intense. Lateral pressure of the neck is equally painful. The patient experiences a disagreeable sensation at the level of the larynx; the inspired air causes a feeling of burning, and even onsets of painful coughing. Respiration may be interfered with in cases of œdematous infiltration, but is usually normal. The disturbances of the voice may vary from simple huskiness to complete aphonia.

Examination shows very often, in the pharyngeal cavity, especially at the level of the base of the tongue or the soft palate, discrete herpetic vesicles. Some of them, character-

istic of the disease, are filled with an opalescent liquid. Others are already burst, and have left a greyish ulcerated spot, surrounded by a highly-congested sore. By means of the laryngoscope we can see at the level of the larynx, specially on the laryngeal surface of the epiglottis and on the aryepiglottic folds or the arytenoids, discrete opalescent vesicles at different stages of evolution. These sometimes appear on the first day of the affection, and at other times on the fourth, fifth, and even sixth. Besides, the malady progresses by successive onsets, showing at certain points small rounded vesicles containing the characteristic opalescent liquid of herpes, and on other parts whitish spots of the size of a millet-seed, or punctiform erosions, covered by a whitish exudation, *surrounded by a red margin*.

In confluent herpetic laryngitis the affected region may be covered with a pseudo-membranous diphtheroid exudation.

*Diagnosis* of the discrete form is easy, owing to general symptoms, intense local disturbances, and the appearance of the lesions. Confluent herpes could be mistaken for laryngeal diphtheria, but in the latter the false membranes are not confined to the epiglottis or to the aryepiglottic folds, but invade the interior of the larynx, even the trachea, and cause much more important disturbances (increasing dyspnoea, progressive aphonia, cervical adenitis, and even Klebs-Loeffler's bacillus).

Pemphigus of the larynx is recognized by the presence of larger and more irregular bullæ, and by the coexistence of similar lesions in the mouth and soft palate. The pains are less pronounced than in herpes.

*Treatment* consists in the administration of light purgatives, quinine, the use of emollient fumigations, borated or bromide gargles, and rest.

### Abscesses of the Larynx

are formed in the interior or the neighbouring parts of the larynx, and are accordingly intrinsic or extrinsic.

*Etiology*.—Those lesions usually occur in adults and adolescents, and are due to certain debilitating infectious

diseases, such as typhoid fever, small-pox, scarlatina, measles, influenza (Moure), and rheumatism. Among direct causes may be mentioned cold and phlegmonous affections, tonsillitis, pharyngitis, adenoiditis, sinusitis, etc. Traumatism of all kinds—wounds, fractures, blows, etc.—may also give rise to abscess.

*Symptoms.*—When the abscess of the larynx is a concomitant of another disease, it may pass unperceived, at least at the beginning, and afterwards produce a series of local and general disturbances.

(a) *Functional Symptoms.*—The abscess is ushered in with febrile symptoms of varying intensity. Soon afterwards an intense pain in the neck occurs at the level of the larynx, often reaching to the ears, and increased by deglutition and pressure. Coughing is extremely painful. The sensation of a foreign body in the larynx is more accentuated when the œdema, or rather the œdema of the neighbouring parts, is more pronounced. Dysphagia depends on the locality of the abscess. It is very intense in cases of pharyngo-laryngeal abscess, but much less when the abscess is in the interior of the larynx. On the other hand, in the latter case the respiratory disturbances are rapid and grave enough to endanger life.

Dyspnœa is consequent on the infiltration and immobilization, partial or total, of one or of both arytenoids. The nearer the tumefaction is to the vocal cords, the more marked is the alteration of the voice. The vocal timbre is always more or less dull; sometimes complete aphonia occurs. Phonation is almost always painful. Coughing is sonorous and frequent at the beginning; afterwards it becomes characteristically raucous. The secretions, almost absent at first, become muco-purulent or even purulent.

(b) *Objective Symptoms.*—Extralaryngeal abscess, symptomatic of perichondritis, or an abscess seated on the external parts of the larynx, is shown by a swelling of the region, puffiness, and fluctuation. Pharyngo-laryngeal abscess is characterized by the swelling of the lateral grooves of the inferior pharynx, with infiltration of the ary- or glosso-



epiglottic folds. Sometimes the epiglottis is infiltrated on one side and immobilized with the corresponding part of the larynx. The affected parts are of a bright shining red, standing out conspicuously on the surrounding mucosa.

In discrete forms a yellowish rounded tumour is observed on the glottic folds. Endo-laryngeal abscess very often occupies the ventricular bands, and sometimes the subglottic region, occasionally even the cricoid and tracheal region, and is characterized by an infiltration of the affected parts with œdema of the neighbouring parts. The purulent accumulation, usually of small bulk, attains the dimensions of a walnut or horse-chestnut.

*Pathological Anatomy.*—In many post-mortem examinations pus has been observed, extending more or less into the submucous cellular tissue. If suppuration occurs between the perichondrium and the cartilage, the latter becomes necrosed if the malady is not checked.

*Course, Duration, and Termination.*—The course of an abscess varies according to its cause, and specially to the general condition of the patient. Purulent infiltration of the vocal mucosa develops rapidly, and may cause death in a few hours by asphyxia. At other times the pus tends to burrow its way to the surface, producing purulent tracts in the neighbourhood.

The duration of the disease varies according to the size of the abscess and to its intensity. Death occurs from inhibitory syncope or asphyxia. When the abscess bursts, pus may penetrate into the bronchi and cause septic pneumonia, which is very grave. Among other possible complications are localized emphysema by rupture of the laryngeal or tracheal walls, blind fistulæ at the level of the thyroid-hyoid membrane, or the thyroid cartilage itself, due to perichondritis.

*Prognosis* is generally grave, the patient being liable to die suddenly of heart failure, even when respiration is ensured by tracheotomy.

*Diagnosis.*—Abscess of the larynx is analogous to acute œdematous laryngitis, but in the latter no true pain exists on

pressure, nor intense dysphagia. The rapid course of the œdema, its termination by resolution, and the less grave character of the affection, facilitate the diagnosis. Erysipelatous laryngitis closely resembles diffuse abscess of the larynx, and is distinguished from it only by a more or less mobility of the lesion and the general symptoms of erysipelas.

Laryngitis stridulus occurs specially in young subjects, and is differentiated by very characteristic symptoms.

A practised eye recognizes the presence of pus under the mucous membrane, which latter is characteristically yellowish, and clearly defined from the more or less red neighbouring parts. Palpation is useless, and possibly dangerous, in those cases.

*Treatment* — (a) *Extralaryngeal Abscess*.—If seen at an early stage, resolution may be attempted by purgation, local application of ice, hot poultices, emollient fumigation. Resolution is aided by leeches, applied externally, and brushing with tincture of iodine, or a solution of zinc chloride (1 : 30).

Should this treatment fail and pus be formed, recourse must be had to incision. If the abscess is on the anterior portion, it should be opened with a bistoury and thoroughly drained; if on the posterior, scarifications should be made, or preferably the abscess opened by the galvano-cautery, or by a clean incision. It is important to make an aperture sufficiently free to permit the pus to escape. Generally this operation is very difficult, as the patient is unable to open his mouth freely. In grave cases tracheotomy must be performed, and the patient fed by an œsophageal canula through the nose.

(b) *Intralaryngeal Abscess*.—At the beginning a similar means of resolution should be employed. Later on the abscess should be opened, preferably with the galvanic point, because this has the advantage of making a large, deep, and permanent opening, and avoids hæmorrhage. The mucous membrane should be anæsthetized by brushing or spraying with a solution of cocaine (10 or 20 per cent.), mixed with some drops of a solution of adrenalin (1 : 1,000). Tracheotomy, if necessary, should be performed.

## Chronic Catarrhal Laryngitis.

A catarrhal, hypertrophic, or ulcerative chronic inflammation of the mucous membrane of the larynx.

*Etiology.*—This disease generally follows acute laryngitis. Chronic suppurations of the nasal fossæ and naso-pharynx, and especially of the accessory cavities, predispose to chronic laryngitis of the larynx.

Heredity seems to affect this disease.

Singers and speakers, etc., specially when they use their voice in an overheated atmosphere or in an unnatural tone, or who are obliged to speak in a register other than what is suitable to the structure of their larynx, are particularly liable to this lesion. The small soprano larynges of women and the light tenor of men endure fatigue much less than the larynges of the mezzo and contralto of women or the baritone of men.

Chronic laryngitis is frequent among smokers and intemperate subjects. It is observed in women during certain uterine affections, and particularly during menstruation.

Arthritic and herpetic temperaments may influence the development of the disease.

Although more usual in middle age, and perhaps in men, chronic laryngitis is met with in children, specially between seven and ten years of age, and notably in boys after too great vocal exertion, or after eruptive fevers.

*Symptoms.*—General symptoms are absent or slight.

Functional symptoms consist of a sensation of irritation in the pharyngeal cavity, or of a foreign body—as a pin in the posterior wall of the pharynx. ‘Hemming’ rather than coughing is observed, specially in the morning.

The most important symptoms are vocal disturbances, which are constant. The voice may be hoarse, raucous, or muffled. Huskiness, pronounced in the morning, may disappear after the expulsion of mucus, etc. The voice may change several times in the day—from aphonia in the morning to almost a clear intonation in the afternoon. Those vocal modifications are more marked in women and singers with high-set voices.

Expectoration is almost nil, except in the morning, when the patient ejects whitish or greyish mucus, according to the dust inhaled. It is sometimes gelatinous and even streaked with blood.

(a) *Catarrhal Form.*—In light cases the malady is indicated by a simple redness of the mucous membrane. The vocal cords no longer present a mother-of-pearl-like appearance, but are greyish and furrowed by a vascular network. They are rough, moist, covered with whitish adherent mucus, which is observed to vibrate with the cords during the emission of the sound ‘eh.’

In graver forms the vocal cords are not only red, but very rough, as if they had been polished by a fine file. They are relaxed, owing to paresis of the subjacent muscle (thyro-arytænoideus). Sometimes they assume a granular appearance, with small reddish projections. Owing to the thickening of the mucous membrane which covers the cords, the latter appear cylindrical.

The epiglottis is sometimes vascularized, but usually unaffected.

The mucosa covering the arytenoids exhibits a velvety appearance. Occasionally those symptoms, though generally diffuse, are more pronounced on one side of the larynx than on the other.

(b) *Hypertrophic Form.*—In hypertrophic laryngitis a diffuse swelling is observed, occupying the epiglottis, ventricular bands, and the cords. All those parts are red and vascularized.

The interarytenoid mucous membrane is thickened, presenting granular, irregular, and mammillated projections, which may be sufficiently prominent to prevent the close approximation of the arytenoid cartilages during phonation. This condition may even extend to the whole length of a vocal cord. The latter is perceptibly increased in bulk, and is of a rosy hue, granular, irregular, and lumpy (*bosselé*). It is the pathological alteration designated by Virchow and by the Germans under the name of laryngeal pachydermia.

There is nothing characteristic in this, for it is seen in other

conditions, as tuberculosis, syphilis, and, according to some authors, in the initial stage of cancer.

An ulcerative form of laryngitis is now recognized. Simple erosions occupy the free edge of the vocal cords, the point of junction of the cord, and the arytenoid at the level of the vocal apophyses. This loss of substance has a gouged-out appearance and prominent red edges.

These erosions, often single, may also be multiple.

Fissures or rhagades occur on the interarytenoid mucous membrane, with raised edges. They are painful during acute onsets, causing a sensation of burning and tingling, accompanied by a racking cough. If paresis occurs, it usually attacks the thyro-arytænoideus.

*Pathological Anatomy.*—The dermo-papillary transformation of the vocal mucous membrane, termed by Virchow laryngeal pachydermia, is the only point of interest.

*Course.*—Chronic laryngitis may last indefinitely, especially if the patient continues in the profession that gave rise to it. However, hygienic and local treatment regularly applied may benefit the patient, or even cure the malady. Hypertrophic forms are usually more tenacious and progressive, but they become stationary or even reduced by energetic treatment.

*Prognosis* is usually benign, very seldom grave. Yet pulmonary tuberculosis is apt to develop in subjects affected with those warty conditions of the vocal cord (inferior corditis).

*Diagnosis.*—Some small polypi of the vocal cords may be confused with nodules, but the polypus is generally more prominent, more bulky, and single. Superficial erosions or ulcerations suggest secondary syphilis or tuberculosis, but the locality of the lesion, its superficial and localized appearance, and the absence of other changes in the mucous membrane in laryngitis; œdema, and peripheral infiltration in tuberculosis; diffuse redness, mucous patches, and other changes of the pharynx in syphilis, complete the diagnosis.

*Treatment.*—In chronic laryngitis, of whatever form, general treatment should be adopted. Any causes of vocal inflamma-



tion should be suppressed if possible, and the patient kept away from the influence of irritating dust and vapours. Local remedies consist of inhalations made with  $\frac{1}{2}$  litre of hot water mixed with a teaspoonful of the following :

R	Menthol powdered	{	... āā 5 grammes	{	gr. 75
	Balsam of Peru				gr. 75
	Balsam of turpentine				gr. 75
	Tincture of eucalyptus	...	300 grammes		3x

Those inhalations should be practised twice or thrice daily for five or six minutes at a time.

The following spray may also be prescribed :

R	Biborate of soda	{	... āā 5 grammes	{	gr. 75
	Benzoate of soda				gr. 75
	Tincture of eucalyptus	...	10	„	℥clx
	Glycerine	...	40	„	5ix
	Water	...	450	„	3xvi

To be used morning and evening for twelve minutes.

Carbolic solutions (1 : 1,000 or 1 : 500) are very suitable as a spray. The patient should breathe gently to avoid fits of coughing. The most effective remedy is cauterization of the laryngeal mucous membrane with the application of cotton-wool soaked in zinc chloride (1 : 100 or 1 : 50, or even 1 : 30). Silver nitrate can be employed in a stronger solution (1 : 50, 1 : 20, or even 1 : 10).

Those cauterizations should be performed twice weekly at the beginning, but only once weekly as the affection subsides.

In true hypertrophic or pachydermic forms the use of caustics applied by the brush is unsatisfactory. Curetting the laryngeal mucous membrane is indispensable, and should be performed preferably with the cutting forceps. After the larynx has been cocaineized and adrenalized, the hypertrophied parts should be punched out. Ignipuncture with the galvano-cautery may be successfully applied, especially when the hypertrophy is localized in the inter-arytenoid mucous membrane, or on the vocal cords. It

may be repeated, when necessary, at intervals of ten to twelve days.

The ulcerous form is treated like that of a simple catarrhal lesion. It is very tenacious, and may persist for several months. A course of sulphurous waters is beneficial.

It must be recollected that laryngitis may depend on a nasal affection, and that the latter should be attended to first.

### Laryngitis Sicca.

Laryngitis sicca, or atrophic laryngitis, is intimately associated with atrophic rhino-pharyngitis, and is usually the outcome of atrophic ozænic catarrh, or of one of the different kinds of strumous pharyngitis.

*Symptoms.*—The outstanding symptom is the sensation of dryness felt by the patient. Respiration is inconvenienced by the accumulation of crusts in the larynx and trachea. Coughing is rare or slight. The voice is dull and in some cases almost extinct, because the inflammation of the cords is very often associated with paralytic disturbances of the thyro-arytenoidei. The secretion is muco-purulent, thick, greenish, often streaked with blood, is more profuse in the morning, and is ejected with a tearing sensation. Dyspnœa, sometimes approaching suffocation, is due to the presence of dried crusts in the larynx. Tracheal ozæna is then observed. Laryngoscopic examination shows thick greenish or blackish secretions on the epiglottis, the interarytenoid region, even the vocal cords, the ventricular bands, the trachea, and the ventricles.

They gather as pellets in the interarytenoid space during efforts at phonation, and are subsequently expelled. The larynx, being once freed from those masses, the cords appear red, rough, irregular, and desquamated on their whole surface. The posterior region is rugose, thickened, and fissured.

*Diagnosis* is, as a rule, easy, owing to the presence of crusts in the larynx.

*Prognosis* is generally benign, and a cure usually takes place; but it should not be forgotten that the affection is of

a very chronic type, and liable to recur, if treatment is not applied regularly to the laryngeal lesion and the coryza to which it is most frequently due.

Treatment, sprays, washes, etc., should therefore be directed to the naso-pharyngeal cavities. Locally, sulphurous or emollient alkaline sprays according to the following formula are of assistance :

R	Benzoate of soda	...	...	8 grammes	ʒii
	Bromide or iodide of sodium	...	4	,,	ʒi
	Glycerine	...	40	,,	ʒviiiiss
	Tincture of eucalyptus	...	10	,,	℥clx
	Water	...	450	,,	ʒxvi

This should be used once or twice daily for five minutes at a time. Inhalations and the painting of the vocal mucous

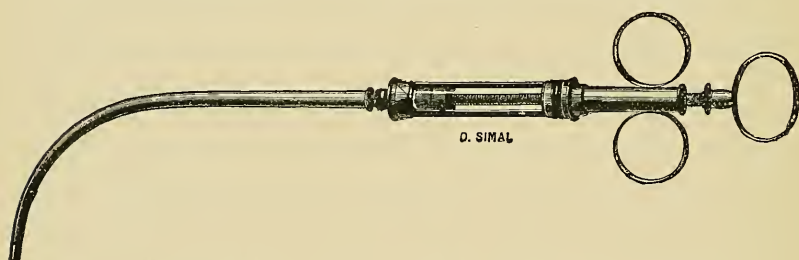


FIG. 100.—SYRINGE FOR INTRALARYNGEAL OR TRACHEAL INJECTIONS.

membrane with iodine solutions, zinc chloride, or silver nitrate (1 : 30 or 1 : 50) are also advisable. Laryngeal or laryngo-tracheal injections made with mentholated oil (3 or 5 per cent.), with or without guaiacum or iodoform, have the great advantage of exciting the secretion of the mucous membrane, and thus facilitate the expulsion of crusts, that encumber the respiratory tracts. Those injections, according to the following formula, may be repeated either daily or once or twice weekly :

R	Thymol	...	10 centigrammes	gr. 1½
	Eucalyptol	...	25	,, gr. 4
	Menthol	...	5 grammes	gr. 75
	Liquid vaseline	...	150	,, ʒv

In obstinate cases benzoate of soda or sulphurous waters are strongly recommended for internal use. The use of atomized fluids is very serviceable, as they can thus penetrate down to the larynx, and even to the trachea.

Lastly, the author would insist on the recognition and treatment of the nasal lesion; otherwise recurrence may take place.

### Syphilitic Laryngitis.

*Etiology.*—Primary syphilis or chancre is very rare in the larynx, because this organ is protected against the usual sources of contamination through its situation.

Secondary lesions, comprising erythema, mucous patches, condyloma, and paralysis, are due, apart from syphilis itself, to the influence of cold, excessive use of voice, and, *above all, to immoderate smoking.*

Syphilis of the larynx in primary or secondary form is observed between the ages of twenty and forty. Tertiary forms are more frequent beyond that age.

#### *Symptoms.*

(A) **Chancre.**—The most outstanding is the existence of pain on deglutition, due to a greyish rough ulceration, surrounded by a red inflammatory zone. Generally a series of indurated lymphatic glands, loose and painless, is observed in the submaxillary region. Those various symptoms are not characteristic, and diagnosis should be based specially on the age of the patient, the abruptness of the onset, and the manifestations of the secondary stage.

(B) **Secondary Lesions**—I. **Erythema.**—In the first stage erythema occurs very frequently, and is characterized by a dark redness, diffuse or localized—specially at the level of the vocal cords—towards their anterior insertion on their free edges, or on the ventricular bands. This redness is formed by the close collection of minute red punctate spots. The eruption is accompanied by analogous lesions on the skin and on the pharyngeal cavity, and may persist even when the mucous patches appear. Some small erosions, due

to a desquamation of epithelium, are sometimes observed in erythema. Secretion is increased, becomes viscid, and dries up at the level of the vocal cords in subjects with chronic coryza, and especially with atrophic coryza.

2. The existence of **mucous patches**, which has long been disputed, is now admitted. They appear usually concurrently with roseola of the skin, and coincide almost always with buccal or anal patches. Their usual seat is at the level of the epiglottis, or on the glosso-epiglottic folds, the ventricular bands, and the vocal cords. They are most frequently isolated, projecting, greyish, with a rough, goffered surface, and surrounded by an inflammatory zone, standing out on a red or even swollen mucous membrane. On the vocal cords the mucous patch is greyish, somewhat projecting, of an almost diphtheroid appearance, but surrounded by a clearly defined edge of a carmine red. Those lesions occur on one or both vocal cords, usually on their superior surface, more rarely on their free edge.

3. **Œdema**.—Around the mucous patches the mucosa becomes swollen and œdematous, so as to produce glottic constriction, with onsets of suffocation. Secondary inflammatory tumefaction occupies almost always the epiglottis and its folds, more rarely the ventricular bands and the subglottic region. Those grave complications are met with in syphilitic patients who use their voice in excess, or immoderately indulge in tobacco and alcohol. The buccal patches in those patients become ulcerated and phagedenic. Violent and inopportune cauterization may also give rise to this condition.

4. **Condyloma** is much rarer in the secondary stage, but the author has seen it in a little girl of six, where the anterior pillars and the lingual base of the epiglottis were covered with those papillary tumours of a greyish white colour, with here and there rosy spots. Similar secondary condylomata have been observed on the ventricular bands, and even in the posterior region.

5. **Paralysis** is usually unilateral, and seems to be more frequently met with on the left side. The paralyzed cord



is almost always immobilized in its medial position, as in recurrent paralysis.

**6. Functional Disturbances.**—During the erythematous stage the timbre of the voice is hardly affected, but may sometimes become raucous. When the mucous patches appear, the vocal disturbances become more pronounced, and according to the seat and intensity of the lesion, broken voice, or even aphonia, occur. If the patches are all extra-laryngeal, a slight pain may be felt on deglutition.

In the case of œdema—dysphagia, respiratory disturbance, and even fits of suffocation, occur over and above. When paralysis takes place the voice is bitonal, dull, or even extinct, according to the degree of paralysis. If the vocal cord is fixed mesially, the voice may remain normal, or hardly altered in its timbre.

**Tertiary Accidents.**—They generally occur long (ten to twenty years) after the primary affection. Tertiary syphilis may be hereditary. Formerly considered rare, it is recognized to be more common, since laryngoscopy has been practised.

**1. Gumma.**—Circumscribed gummatous tumours have usually a smooth, even, reddish surface, and are clearly defined by a peri-inflammatory infiltration. When the gumma is about to become soft, small yellowish projections appear where the crateriform ulceration takes place. These becoming contiguous, give the mucous membrane an irregular mammillary appearance. These lesions rest on an infiltrated basis.

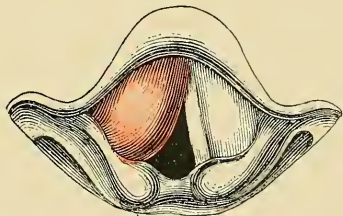


FIG. 101.—GUMMATOUS INFILTRATION OF THE RIGHT VENTRICULAR BAND.

The infiltrated gumma appears as a red, smooth, inflammatory, elongated swelling; the affected portion is much distorted, and frequently disappears.

Those syphilitic lesions, in order of frequency, occur on the base of the tongue, the epiglottis, the ventricular bands, the aryepiglottic folds, the vocal cords, and especially in the sub-

glottic region ; they are usually unilateral, and may pass from one side to the other.

The affected part is only immobilized, when crico-arytenoid arthritis simultaneously exists. It is not rare to see gummatous infiltration pass from one side to the other, and invade the two sides of the organ.

2. **Ulcerations.**—Ulcerations usually constitute the second stage of the gummatous process, but the phase of

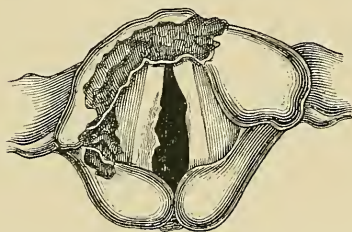


FIG. 102.—TERTIARY ULCERATION OF THE EPIGLOTTIS, OF THE VENTRICULAR BAND, AND OF THE ARY-EPIGLOTTIC FOLD (RIGHT SIDE).

The left side of the epiglottis is very infiltrated, as well as the ary-epiglottic folds.

infiltration may develop so rapidly as to pass unperceived, and ulceration is present by the time advice is sought. Ulceration rapidly gains in breadth and depth, penetrating into the chorion of the mucous membrane, the sub-mucous tissue, and reaching the cartilage, which first becomes ossified, and then necrosed. The larynx is filled with red polypoid-like granular vegetations, and the edges of the ulcer become infiltrated, if treatment does not check the progress of the affection. The epiglottis—shredded, ragged, and perforated—disappears almost entirely, and the interior of the larynx becomes deformed from loss of substance. The ulceration assumes an irregularly indented and fringed appearance ; its edges project, more or less sharply defined, and are sometimes undermined by the ulcerative process. These semi-detached masses of the mucous membrane swaying in the interior of the larynx produce suffocation, if not removed by the forceps. According as the ulcers follow a circumscribed or a diffuse gumma, the ulceration gains in depth, and reaches the perichondrium or cartilage,

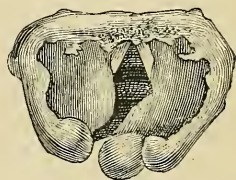


FIG. 103.—TERTIARY ULCERATION WITH ALMOST TOTAL DESTRUCTION OF THE EPIGLOTTIS.

or extends to the neighbouring parts—the pharynx or the base of the tongue.

3. **Perichondritis.**—In some cases the perichondrium and the cartilages are attacked first. The ulceration is then secondary. In those forms the vocal apparatus is completely destroyed by vast necrotic ulceration. In those kinds of primary perichondritis the swelling is visible externally, and there exists in front of the larynx that distinctive carapace characteristic of thyroid perichondritis. The cartilage is painful to the touch, and external fistular tracts are observed, which may penetrate internally.

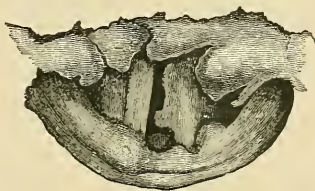


FIG. 104.—TERTIARY ULCERATION WITH DESTRUCTION OF THE EPIGLOTTIS, ITS FOLDS, AND THE ARYTENOID REGION, TOGETHER WITH DEFORMITY OF THE LARYNX.

4. **Pseudo-polypoidal Form.**—Some syphilitic patients present true pseudo-polypoidal forms, diffuse degenerations invading the whole larynx. These lesions almost resemble diffuse papillomata of the larynx, but the bosses are more voluminous, redder, and more projecting. The posterior region and the ventricular bands are thickened and infiltrated, resembling pachydermia. The degenerations only partly recede under specific treatment, and the forceps and galvanic cautery should always be applied.

5. **Laryngeal Stenosis.**—The above alterations often leave permanent scars—various constrictions characterized by adhesion of the two vocal cords, or by the formation of a true membrane which unites them. In other cases one of the arytenoids becomes ankylosed. The elimination of some cartilages may also be the cause of laryngeal stenosis. Finally, a true annular constriction may take place. Those various affections of the mucous membrane are easily recognized by laryngoscopic examination. When a web exists, a whitish membrane, greyer and less glittering than the cords, is seen during inspiration, generally occupying the anterior third of the larynx, and forming

a crescent, the concave edge of which is directed backwards.

6. **Paralysis** is observed in the tertiary, as well as in the secondary period, and may be attributed to recurrent compression or myopathic causes, as peripheral neuritis. Those different forms of syphilis may occur concurrently.

Functional symptoms of the tertiary period are not very characteristic. The voice may remain almost normal or become extinct, according to the locality of the lesion.

Expectoration, usually nil, may in cases of ulceration become muco-purulent, streaked with blood, or even fetid when perichondritis or necrosis exists. The detritus of ossified and necrosed cartilages is found in the expectorations.

Respiration is sometimes not interfered with, but the respiratory disturbances may become grave, even attaining to stertorous breathing and asphyxia. Those troubles are usually more pronounced during the night, and are the more pronounced the more rapid the affection. In gradually developing stenosis the patient gets accustomed to the impeded breathing, and the glottic orifice may be very narrow, although little pain is felt.

Stridor, when it exists, takes place both during inspiration and expiration, but is more pronounced in the former. Asphyxia may be rapid, even abrupt, if a fragment of cartilage or of sphacelated mucous membrane falls into the air passages, or if acute œdematous infiltration has taken place.

Fetor of the breath is rare. If it is present, the nasal fossæ and the lungs should be explored to discover the necrotic or gangrenous focus.

Spontaneous pains are usually absent. Pressure at the level of the larynx is almost painless, unless the cartilages are affected with perichondritis. Deglutition is generally unaccompanied by pain, unless the inflammation occupies the epiglottis or the posterior region of the larynx, in which case the pain may become very acute, and prevent the patient from taking food. Liquids produce a sensation of burning, extending up to the ears. Often, even liquids regurgitate

through the nose, or penetrate into the air passages, causing violent spasms of coughing. The sensibility of the pharyngeal cavity is somewhat dulled. In those cases laryngoscopic examination is easy, whereas in tuberculosis it is very difficult.

*Course, Duration, and Termination.*—The course of laryngeal syphilis is usually prolonged. Erythema and mucous patches may last for several months, also the vox syphilitica which accompanies it. However, the complications of the secondary period gradually yield to a well-directed treatment. Paralysis alone is permanent. The voice may recover its normal timbre, although one of the cords remains paralyzed, owing to the compensation of the other.

The duration of these tertiary lesions depends on their form, intensity, and age. If the patient has taken timely advice, the cure rapidly follows. If, on the other hand, the cartilages and the perichondrium are affected, no result can be obtained for months. Finally, if arthritis, and specially infiltration with perichondritis, exist, the disease is very obstinate, and recurrence is common, particularly in smokers, who will not give up that habit.

The termination of the secondary stage is complete resolution, without scarring. The lesions are merely superficial.

Tertiary syphilis leaves no trace if treatment has been applied sufficiently early and energetically. On the contrary, in grave forms, where the tissues and the cartilages are much damaged, the malady ends with synechiæ and scars.

*Diagnosis.*—During the secondary period syphilitic erythema and mucous patches are easily recognized by the coexistence on the throat, etc., of similar lesions. Syphilitic glandular involvement and corresponding lesions of the scalp facilitate diagnosis. Infiltration alone might produce a confusion between syphilis and tuberculosis, but tumefaction is more rapid in syphilis than in tuberculosis. Moreover, secondary syphilitic infiltrations rarely exist without the neighbouring parts, soft palate, pillars, and tonsils, being also similarly attacked.



At the ulcerative stage the tertiary lesions may be confused with those of tuberculosis, but functional disturbances, especially coughing, dysphagia, and expectoration, are more pronounced in tuberculosis than in syphilis. Discoloration of the tissues and diffusion of the lesions belong rather to the former, which is found most generally on the posterior portion of the larynx. Finally, the general state of the patient, the examination of the expectoration, or of a small portion of the lesion, will clear up the diagnosis.

Cancer may also be confused with a gumma at the outset of its ulcerative stage. In both cases a deep red circumscribed swelling, occupying either one of the ventricular bands or the epiglottis, is observed. In both cases the affected part is painless, but the course of the two affections is very different. *Spontaneous* pain, with radiation towards the nape of the neck or the bottom of the throat, may be considered characteristic of cancerous lesions. Small hæmorrhages, or at least the presence of blood in the expectorations, point to neoplastic ulceration rather than to simple gumma. The breath is more fetid in malignant ulcerated tumours. The course of the disease is much more rapid in syphilis.

At the stage of tumefaction diagnosis is usually much easier, because the warty appearance of the cancer could not be confused with a fungous syphilitic ulceration, where the globular projection is less, and the ulcerated part more diffuse and serpiginous. The cancerous tumour is liable to bleed, and is surrounded by an inflammatory zone, hard, woody, and infiltrated, which is not found to such an extent in syphilis.

In malignant neoplasms the affected vocal cord is usually immobilized very early, a fact which occurs almost exclusively in syphilitic arthritis.

The presence of perichondritis with a laryngeal carapace is usually symptomatic of cancer. If it is seen in syphilis, it occurs at a stage at which the disease cannot be mistaken. In hybrid cases diagnosis is very difficult, but in those forms the lesions usually invade the base of the tongue, often even the pharynx, causing serpiginous ulcerations with projecting edges (syphilis), or red indurated infiltrated folds,

with warty tumours, bleeding easily, adherent, and accompanied by hard and painful adenopathy (cancer).

Lupus possesses sufficiently well-defined characteristics to prevent its being mistaken for syphilitic ulcerations. Moreover, the ulcer is distinguished by fungous rosy projections, rather than by true ulcerous loss of substance.

Apart from cutaneous symptoms, leprosy presents clearly marked symptoms, which will be afterwards dealt with. Histological examination will clear up the diagnosis.

*Prognosis.*—Syphilis in the larynx is graver than in other organs. Erythema is dangerous or serious only for professionals, but œdema of the larynx is always grave, and paralysis at this stage may necessitate surgical intervention.

At the tertiary period the complications are much more dangerous, for often the patient seeks medical advice when the lesions are too far advanced.

Stenosis, consequent on destructive ulceration, is one of the most dangerous features in the prognosis. Tracheotomy may prevent death, but frequently the patient is obliged to retain the canula permanently. Fatal hæmorrhages also occur.

*Treatment.*—Some authors favour an exclusively mercurial treatment, others believe in iodine. The author, when he has to act promptly and energetically in syphilis of the larynx and pharynx, prescribes a mixed treatment. If it is a case of constitutional syphilis, mercury should be prescribed at the secondary stage, and mixed treatment during the tertiary.

When the mixed treatment is adopted, mercury may be used in the form of pills, ointment, or subcutaneous injections, whereas iodide of potassium or of sodium is administered internally. Contrary to some practitioners, the author does not recommend large doses; even in exceedingly grave cases he never exceeds 3 grammes of iodide a day, administered according to the following formula :

R Biniodide of mer-		
cury solution	15 to 20 centigrammes	gr. $2\frac{1}{2}$ to 3
Iodide of potassium	15 to 25 grammes	ʒiiss to ʒvi
Aqua ... ..	300 „	ʒx

Two tablespoonfuls a day before food in a little sugared water.

Usually the iodide causes inflammatory, even œdematous, onsets, which might suggest a wrong diagnosis, but those onsets disappear after five or six days. If the glottic stenosis is too pronounced, the practitioner should be ready to open the air tract.

*Local Treatment.*—First suppress every cause of irritation, as alcohol and tobacco. Painting with biniodide solution, or with one of silver nitrate (1 : 50 or 1 : 30), should be practised. Cauterization in the larynx with acid nitrate of mercury (1 : 50 or 1 : 30) is more active, but is liable to cause glottic spasm.

During the tertiary period local cauterization in the larynx should only be performed, if the patient is not too intolerant. The best remedies at this stage are dilute solutions, or even pure tincture of iodine or chromic acid, when the ulcerations are seated outside the larynx. If débris of mucous membrane or of cartilages, or too voluminous warty swellings exist, they should be removed by suitable forceps.

Post-ulcerous scars and membranous bridges may be excised with a laryngeal knife, or by the galvano-cautery after the application of cocaine and adrenalin. A mere section is not always sufficient, and must be supplemented by a slow and progressive dilatation of the laryngeal orifice.

### Laryngo-stenosis.

*Etiology.*—Laryngo-stenosis supervenes after an ulcerative affection of the larynx, but is sometimes congenital.

Acute submucous and perichondritic diseases (scarlatina, measles, small-pox, and typhoid fever) frequently terminate in cicatricial stenosis, which results from cicatricial adhesions, or from necrosis of the cartilages.

Lupus and subacute tuberculosis, when they recede, may cause laryngo-stenosis, from the cicatrization of diffuse ulcerations, or from the slow formation of a fibrous cicatricial tissue.

Syphilis at the tertiary period, scleroma, violent burns,

fractures, even external laryngeal operations, intubation, and tracheotomy, may also produce constriction of the larynx.

In point of fact, the presence of the tube directly under the vocal cords causes continual irritation and subglottic infiltration, thus preventing its subsequent withdrawal. Moreover, the section of the cricoid in *young subjects* occasions the forcible opening of the cricoid ring, and consequently immobilizes the two arytenoids in the middle line. Abduction of the vocal cords is consequently impeded during the act of inspiration. Should the canula remain *in situ* for a short time only, the crico-arytenoid articulations have not got time to become fixed in this position; but if the canula is not removed for several weeks, or *à fortiori* for several

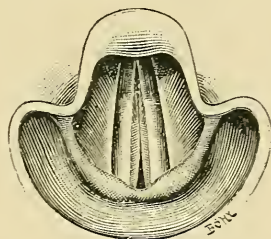


FIG. 105.—APPEARANCE OF THE STENOSED LARYNX DURING INSPIRATION.

The arytenoids do not separate from the middle line, and the subglottic region is infiltrated.

months, stiffness of articulation ensues, which does not disappear on the removal of the canula. According to the author's opinion, this constitutes the laryngeal stenosis, which is erroneously attributed to laryngeal spasm. Apart from mechanical deformity, inflammatory stenosis may also result, and this may only be prevented by the removal of the canula, or by inserting it in another part of the larynx (inferior tracheotomy).

Those inflammatory laryngo-stenoses in young people are almost always the result of intercrico-thyroid tracheotomy, in which the cricoid had been severed. The author does not refer to cases where section of the air passage has been made on the thyroid, almost in the middle of the vocal cords.

In these cases inflammation, following the use of the canula, is sufficient to account for the stenosis.

Other causes of laryngo-stenosis are external laryngeal operations—*e.g.*, removal of half the thyroid, and partial resection, more or less considerable, of the laryngeal framework.

*Symptoms—Diagnosis.*—The symptoms vary according to

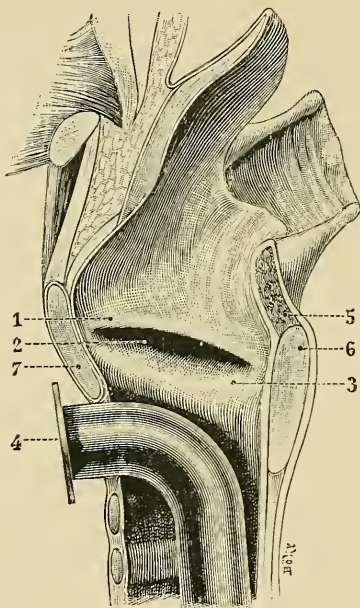


FIG. 106.—ANTERO-POSTERIOR SECTION SHOWING THE TRACHEAL CANULA IN THE CRICO-THYROID SPACE, AND INDICATING ITS CLOSE CONNECTION WITH THE SUBGLOTTIC REGION.

- 1, Border of the ventricular band; 2, ventricle; 3, vocal cord; 4, orifice of the canula; 5, section of the arytenoid; 6, section of the cricoid; 7, section of the thyroid cartilage.

the nature and cause of the constriction. The main disturbances are those of the voice, which becomes dull or even extinct, and of respiration. The latter may not be interfered with, although the stenosis is very pronounced, if it has taken place slowly.

It is of importance to distinguish superficial cicatricial stenosis from stenosis *en masse*, in which the whole laryngo-



tracheal passage is thickened, narrowed, and transformed into a kind of fibrous tube, with an irregular opening more or less rigid.

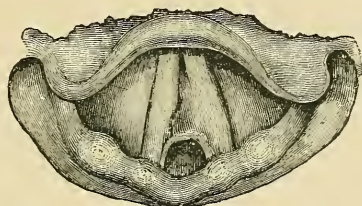


FIG. 107.—FIBROUS BAND UNITING THE VOCAL CORDS, AND ONLY LEAVING AN OPENING PERVIOUS POSTERIORLY (ARYTENOID REGION).

*Prognosis* depends on the form, nature, and duration of the constriction.

*Treatment.*—If the constriction is due to a simple membranous bridge, or to a fibrous band extending from one

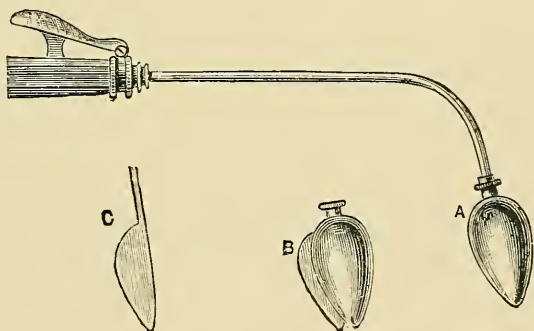


FIG. 108.—WHISTLER'S OLIVE-HEADED BOUGIE FOR CUTTING MEMBRANOUS BRIDGES.

A, Olive-shaped extremity concealing the blade C, which appears in B when the spring is pressed.

vocal cord to the other, or over the vestibule of the larynx, a simple incision with the galvano-cautery, followed by dilatation, will keep the passage patent.

In inflammatory forms irritating agents should first of all be suppressed, and then an appropriate treatment applied. If the stenosis results from the canula being placed in the intercrico-thyroid space, with section of the cricoid, it will

be sometimes possible to keep the tract open by inserting the canula below the second or first ring. In true chronic and tubular forms the best treatment is dilatation, either before or after tracheotomy. Schrötter's tubes (hollow-stemmed and following the curve of the larynx) are the simplest to employ. These tubes vary in thickness from 9 to 21 milli-

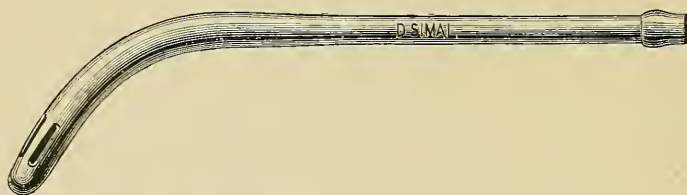


FIG. 109.—SCHRÖTTER'S LARYNGEAL DILATOR IN METAL (Nos. 1 to 12).

metres antero-posteriorly, and from 8 to 14 millimetres transversely, and are made of vulcanite, nickel, etc., so as to be aseptically cleaned. The tube, slightly warmed and coated with vaseline, should be introduced with the finger, or preferably, in the case of adults, under the control of the laryngeal mirror. The characteristic noise of the tubular breathing, onsets of coughing, and the ejections of some

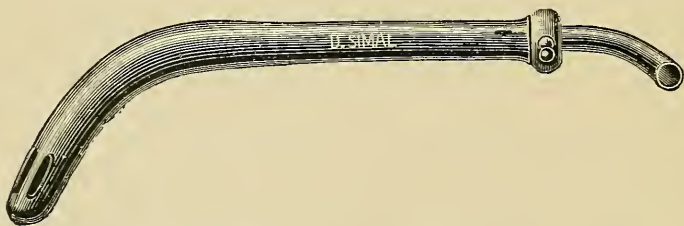


FIG. 110.—SCHRÖTTER'S LARYNGEAL DILATOR IN VULCANITE (Nos. 1 to 12).

mucus, indicate that the tube has passed the constricted part. It is sometimes necessary to cocaine the glottic mucous membrane, and even to adrenalize it.

At the outset the tubes can hardly be tolerated for more than a few minutes, but gradually the patients become accustomed to bear them for several hours. The frequency

with which dilatation should be practised varies according to the irritation produced by it, the patient being kept under supervision, because tracheotomy may become necessary at any time.

Schrötter tubes are now superseded by those of O'Dwyer. The latter are an excellent means of treating, with or without tracheotomy, chronic atresia of the larynx. In such cases a tube with a large head and a small body should be preferred, as it is more easily tolerated by the patient. The shape of the tube must be adapted to the degree and form

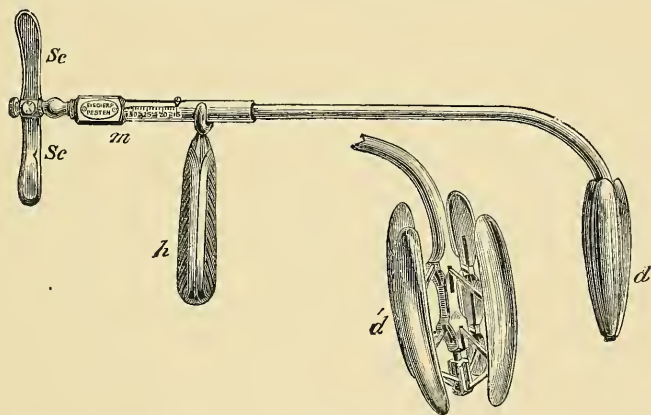


FIG. III.—NAVRATIL'S DILATOR.

*d*, Olive-shaped extremity closed; *d'*, the same open; *h*, handle of the instrument; *sc*, handle enabling the part *m*, which is furnished with a scale, to indicate the degree of dilatation of the blades of the olive-shaped extremity.

of the constriction. Too small tubes are to be avoided, as they are liable to be expelled spontaneously, or fall into the trachea. Massei and Lefferts recommend vulcanized tubes as being less irritating. Dilatation must be supervised carefully, lest inflammation take place.

Most frequently dilatation is made after tracheotomy in order to avoid asphyxia, and is performed by forcible dilatation with Fauvel's forceps. This treatment has not given good results in true cicatricial stenosis. Egidi advises the combination of resection of the cicatricial tissue around the

canula, and five or six days afterwards forcible dilatation with a dilator introduced through the tracheal orifice; but this procedure is suitable only in a few forms of laryngo-stenosis. Schrötter's tubes, Beniquet's tin bougies, metallic drills, and

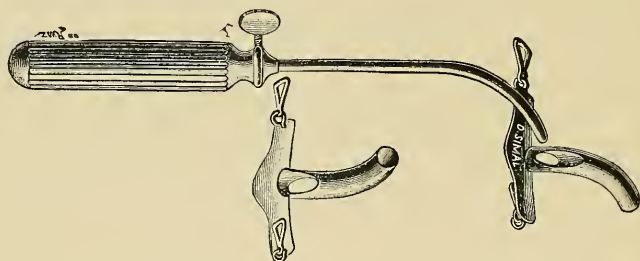


FIG. 112.—DR. BOULAY'S CANULA AND DILATOR.

Boulay's catheter should be used in turn, according to the necessity. Boulay's instruments are designed specially for children. This author recommends, that for an ordinary tracheal canula there should be substituted one with double

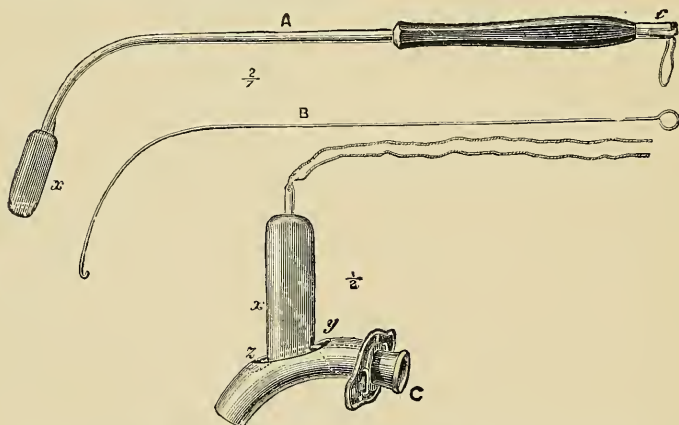


FIG. 113.—SCHRÖTTER'S 'OLIVES' INTRODUCED BY THE MOUTH.

special window. The child being placed by an assistant in the laryngoscopic position, a catheter of medium calibre may be introduced, either directly by causing him to retch, thus raising the epiglottis and enabling the operator suddenly to

introduce the tube, or by the aid of the mirror. The catheter is left for a few moments, then taken out, and replaced by a somewhat larger one, and so on. In the interval the ordinary canula is used. When the dilatation is sufficient

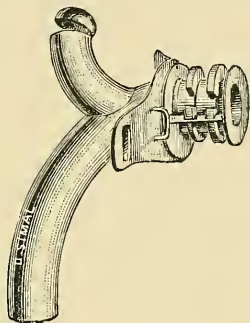


FIG. 114.—DILATING CANULA ACTING FROM BELOW UPWARDS.

to admit a tube of medium size, intubation should be preferred to calibration. The most important point is to avoid making a false passage through the tissues, and therefore the procedure should be carried out gently.

If the above means fail, protracted dilatation should be

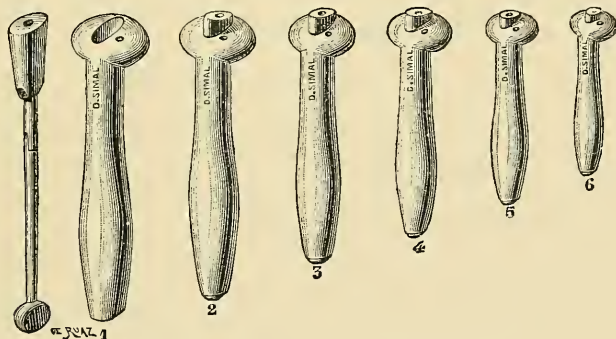


FIG. 115.—DR. SEVESTRE'S SERIES OF TUBES.

made with Schrötter's 'olives.' The latter consist of a series of small dilators of olive form, the inferior part of which has a rounded knob, whereas the superior portion is furnished with a tiny flattened perforated stem, with a small hole to



allow the passage of a thread. The olive being thus suspended is inserted into a hollow stem, following the laryngeal curve, and is supported by a handle, which serves to introduce it. Once the latter is in position, the thread is released, and the olive-holder is then withdrawn alone. The inferior knob of the bougie is fixed by means of special thin forceps introduced into the tracheal canula.

Generally these tubes cause pain or inflammation, which do not permit continuation of the treatment.

Some authors have recommended the use of rubber bougies. Thost of Hamburg advises a series of conical bougies introduced from below upwards. Indiarubber tubes passing into the larynx and out through the tracheal wound, and Hering's flexible tubes or laryngo-tracheal canulæ, are also employed.

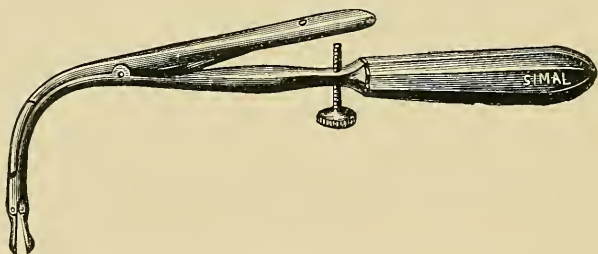


FIG. 116.—FORCEPS FOR EXTRACTING THE TUBES.

Surgical treatment may also be resorted to. In the case of simple fibrous strictures, the bistoury, or better still the galvano-cautery, are sufficient; but, if the constrictions are more extensive and really tubular, thyrotomy should be performed. Once the larynx is opened, and the constriction laid bare, the fibrous tissue and even the ventricular bands may be resected.

After the operation a tracheal canula will ensure respiration for some days. In case of need, an ordinary tube, fitting the organ, may be left in the larynx. For this purpose laryngo-tracheal canulæ, T-shaped, might also be employed to ensure respiration by the larynx and the trachea, and prevent, by means of the glottic tube, recurrence of constriction. The apparatus should be adapted to individual cases.

Some authors recommend abstention from the use of any endolaryngeal medication and of the canula, as they think that all those foreign bodies only irritate the wound and postpone its cure, and may cause an abundant production of granulations, giving rise to a new stenosis. The author advises the following method :

Once the larynx is opened (median thyrotomy) and the fibrous parts resected, the thyroid cartilage should be immediately reunited, the cavity being left without plug or foreign body. The tracheal canula should remain in position for some weeks or even some months.

### Laryngeal Tuberculosis.

Tuberculosis of the larynx may be classified into primary and secondary, according as it precedes or follows the general affection, and into acute, subacute, and chronic, according to its course.

*Etiology.*—Tuberculosis of the larynx may begin either before, after, or during the pulmonary manifestations.

Laryngeal primary tuberculosis, formerly denied by some authors, is now recognized by most laryngologists.

The laryngeal manifestations of tuberculosis may occur at any stage of phthisis pulmonaris, and do not necessarily correspond to it in its evolution.

Laryngitis, designated as that occurring in tuberculous people, evidently exists as a simple catarrhal lesion ; but as soon as ulceration appears, we think that it rapidly assumes the character of the general affection in becoming tuberculous.

This disease seems to be an affection specially of adults, occurring chiefly between twenty and forty ; men seem to pay a larger tribute to its ravages than women, as it is favoured by alcoholism and abuse of all kinds (tobacco, etc.).

Old atrophic, purulent, or ozænic coryza, measles, typhoid, and influenza predispose to tuberculosis.

*Pathogeny.*—The researches of Villemin on tuberculosis and the discovery of Koch's bacillus have made it much easier to explain the localization of tuberculosis in the larynx.

Bacilli from the lungs find a suitable nidus in the eroded and even ulcerated or inflamed surface of the larynx. The larynx is more frequently affected than the trachea, as its mucosa is more exposed to inflammation. Moreover, cough and expectoration produce an energetic friction of the cords, capable of eroding them, and favouring ingress to bacilli proceeding from the lungs. In patients predisposed by hereditary taint or morbid antecedents, the affection may also come from without.

The larynx may also be invaded from within outwards by bacilli carried by the blood or lymphatic vessels.

I. FUNCTIONAL SYMPTOMS—**Voice**.—At the catarrhal stage the patient complains specially of huskiness, which very rarely attains to aphonia. If the muscles are affected, the vocal disturbances are more pronounced; usually the timbre is merely raucous, husky, or bitonal.

In the secondary stage the voice is masked and tremulous, at times even aphonic. In the last stage it is completely muffled, so that the patient whispers rather than speaks.

Disturbances of phonation are not always correlated to changes in the mucous membrane. Some patients may be at a very advanced stage, and yet have an intact voice.

The vocal alteration may be due to catarrh, to thickening, to ulcerations of the cords, to infiltration or vegetations in the interarytenoid region, or to the tumefaction of one or both ventricular bands, which prevent the cords coming together or vibrating. Sometimes the vocal cords are entirely destroyed, yet the patient continues to speak, owing to the ventricular bands replacing them. The voice has then a masked timbre. Paralysis, by alteration or compression of one of the recurrences, produces chiefly vocal bitonality.

**Pain—Deglutition**.—At the primary stage pain is almost nil, consisting of a disagreeable titillation, which causes a spasm of coughing, although the affection of the larynx is very slight, being limited to a mere redness of the cord and of the arytenoid region. During the secondary period pain and dysphagia are more pronounced, as the ulcerations

are situated more externally to the larynx—*i.e.*, on the epiglottis and arytenoid region. The manifestations in the interior of the larynx are almost painless. When pain does exist, it extends to the ears, and is generally more pronounced on one side than on the other.

It is specially during the tertiary stage that pain in deglutition is most intense, and is exasperated on each movement of the organ, owing to the passage of the food over inflamed or ulcerated surfaces, and also to the friction of two irritated and swollen mucous membranes. The author has observed cases in which dysphagia was a sequence of osseous hypertrophies, originating in the cricoid, perforating the arytenoid mucous membrane, and projecting into the œsophagus.

Considerable pain on deglutition may coincide with a mere œdematous infiltration, without ulceration of the posterior wall of the larynx. It is then caused by perichondritis or crico-arytenoid or crico-thyroid arthritis. The propagation of the pain to the ears is explained by Dr. Beverley-Robinson as due to the intimate connection existing between the ear and the larynx, as the sensory auricular branch of the superior ganglion of the vagus (Arnold's filament) innervates the auditory meatus and the tympanic membrane.

The deglutition of saliva and of liquids, especially milk, is more painful than in the case of a bolus, and the patient complains of an acute burning sensation in the throat. Some may on this account even abstain from food.

Phonation and coughing are only painful in the tertiary stage, and in grave ulcerous and advanced forms.

Except in the case of cricoid perichondritis, the larynx is painless to the touch. Krishaber and Peter have for long noticed, that the cough was not the result of laryngitis alone, but rather the consequence of concomitant pulmonary affection, as in primary laryngeal phthisis this symptom is completely wanting. Although the author thinks this statement somewhat sweeping, it is certain, that cough is not an outstanding symptom in laryngeal tuberculosis. It is usually dry and short at the beginning, and assumes a croupoid

character, if phenomena of recurrent irritation exist, accompanied by a sensation of itching. The accumulation of mucus on the posterior region or on the edge of the vocal cords may also produce 'hemming' rather than true cough. On the contrary, when this symptom is due to pulmonary lesions, the cough follows the changes of the voice, being successively sonorous, raucous, veiled, or jerky, even aphonic, often of a belching sound, or is accompanied by efforts of vomiting.

**Respiration**, normal in the catarrhal period, may be interfered with at a more advanced stage, owing to the immobility of the vocal cords by crico-arytenoid arthritis, infiltration of the glottic orifice or subglottic region, or to the existence of polypoidal or other vegetations in the larynx. A surgical operation sometimes becomes necessary.

**Expectoration** depends on the condition of the lungs. At the outset it is almost nil. Later on it becomes abundant, as the patient, being afraid of swallowing, ejects the secretions. True laryngeal expectoration is sometimes mucoid, muco-purulent, purulent, or tinged with blood, or may even contain detritus of necrosed cartilage. It is very difficult to determine, which part of the secretion comes from the larynx, or if it only passes over it.

GENERAL SYMPTOMS are not always in correlation with the laryngeal lesion, as the patient may have a comparatively good appearance, though his larynx is in a deplorable condition. The general state depends more on the pulmonary lesion than on the laryngitis, but, if both coincide, the patient rapidly wastes.

II. OBJECTIVE SYMPTOMS — I. **Primary Catarrhal Period.** — At this stage of bacillary laryngitis, laryngoscopic examination reveals lesions which considerably resemble those of a simple acute or chronic catarrhal inflammation. In some cases, however, they are sufficiently well defined to indicate the commencement of laryngeal tuberculosis. A redness of a carmine hue confined to the posterior part of the larynx, on the arytenoids or vocal cords, persisting for several weeks in a patient already run down in



health, patches of hyperæmia or ecchymosis disseminated in the larynx; sometimes an excessive pallor of the mucosa of the pharynx, soft palate, and larynx, are symptomatic of tuberculosis. These lesions are frequently associated with a verrucose condition of the interarytenoid mucous membrane. This symptom for a long time has been considered as of capital importance, and of almost pathognomonic importance, but has lost much of its significance since the lesions of the larynx have become better known. This verrucose condition occurs in laryngitis accompanying either atrophic coryza or some arthritic anginæ.

If the interarytenoid mucous membrane appears almost polypoid, showing greyish papillary projections separated by

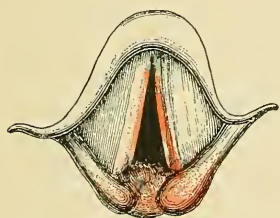


FIG. 117.—BACILLARY LARYNGITIS (CATARRHAL PERIOD).

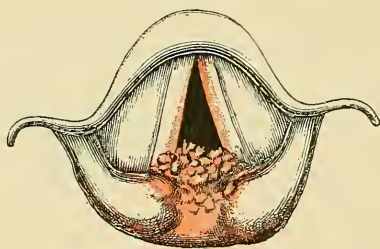


FIG. 118.—TUBERCULOUS LARYNGITIS (SECOND STAGE).

furrows, and if infiltration is observed in the interarytenoid mucous membrane or the aryepiglottic folds, incipient bacillary laryngitis is suggested.

The concomitant presence of erosions clearly points to bacillary laryngitis.

**2. Secondary Period : (A) Circumscribed Œdematous Form.**—At this stage it is usual to observe, either a redness confined to a part of the larynx, or a diffuse pallor. The posterior or interarytenoid region is seldom unaffected, and shows a velvety papillary appearance.

At the same time infiltration appears at the level of one of the arytenoids and of the corresponding folds. Sometimes only one vocal cord is affected. It is increased in bulk, becomes rugose and granular, with small superficial

indentations (*corditis vocalis inferior*). The ventricular band may also be similarly affected, but the epiglottis is usually spared. At other times the lesion is somewhat more diffuse, the infiltration occupying almost the whole posterior region of the larynx. The vocal cords are merely red or a little swollen, and present on their free edges or posteriorly superficial ulceration. True granular ulcers with greyish bases occupy the corresponding portion of the ventricular band, or, more rarely, the laryngeal surface of the epiglottis. The latter is generally unaffected; the aryepiglottic folds are scarcely infiltrated. It is evident here that we are in the presence of hard localized œdema described by Gougenheim and Tissier under the name of hypertrophic sclerema.

In certain forms posterior infiltration is comparatively

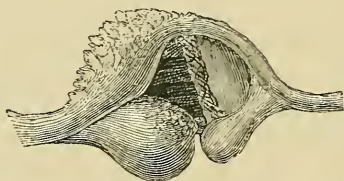


FIG. 119.—BACILLARY LARYNGITIS (SECOND PERIOD).

Ulceration and pachydermic degeneration of the epiglottis and of the interior of the larynx.

slight, and the affection seems to be limited to the vocal cords, which become red, granular, and swollen. The ventricular mucous membrane, infiltrated and projecting, partly covers the underlying cords. The cords present mesially, either on the upper surface or on their free edge, small ulcers, the prominent parts of one filling into the depression of the other. In this case phonation is deeply affected, because the thyro-arytænoideus is more or less parietic.

(B) **Diffuse Ulcero-œdematous Form.**—This constitutes typical laryngeal tuberculosis, whether the infection originates in the larynx or is consequent to pulmonary lesions. The parts of the mucous membrane most frequently affected are those of the arytenoid region, vocal cords,

ventricular bands, aryepiglottic folds, epiglottis, and subglottic region. The lesions of the arytenoid region, which are never absent, are sometimes symmetrical, but most frequently are more pronounced on one arytenoid than on the other. The aryepiglottic folds, unequally infiltrated, give a

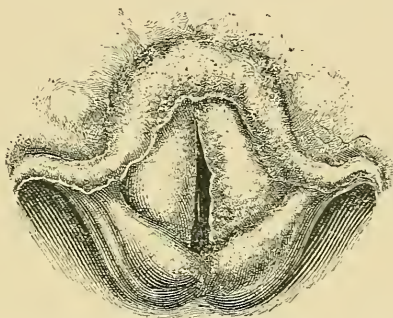


FIG. 120.—DIFFUSE ULCERO-ŒDEMATOUS BACILLARY LARYNGITIS.

deviated appearance to the larynx. They assume a pyriform shape.

Each of the ventricular bands is transformed into a somewhat indefinite ridge. The swelling may become so pronounced, that it reaches the ventricles of Morgagni, the

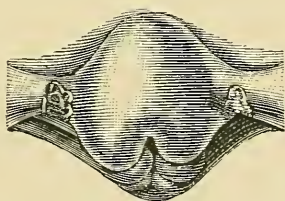


FIG. 121.—TUBERCULOUS LARYNGITIS.

aperture of which disappears, and varieties of pseudo-inversion of the mucosa are formed. (Those have been erroneously termed by authors ventricular eversion. It is now known, that the mucosa of the ventricle may be so swollen, as to cover totally or partly the subjacent vocal cord, but it is in no case detached from the thyroid

cartilage to become inverted into the larynx.) When the swelling reaches the epiglottis, the infiltration, sometimes limited to the lingual surface, gradually subsides towards the free edge, which becomes more or less thickened. Most frequently the tumefaction is general and causes immobility and deformity of this organ, which extends to five or six times its normal size.

At this stage ulceration is also observed, disseminated here and there, but chiefly on the posterior surface of the ventricular bands, the vocal cords, the epiglottis, and the arytenoid region. These ulcers, generally flattened and crateriform, are very superficial at the outset, and their edges blend gradually into the healthy parts, but at a later stage

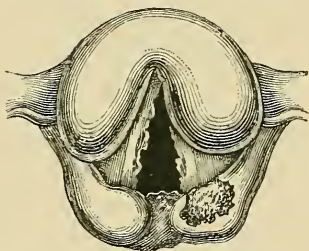


FIG. 122.—TUBERCULOUS LARYNGITIS (DIFFUSE FORM).

The epiglottis is swollen; the arytenoid region and the cords are tumefied and ulcerated.

they are easily recognized by their greyish and anfractuous surface, their more projecting and even ragged edges. These losses of substance are almost always multiple, disseminated over the whole larynx, without a well-defined line of demarcation. On the epiglottis they usually occupy the free edge or the lingual surface. In the larynx they are confined to the arytenoids or the ventricular bands. Sometimes they reach the subglottic region. In that case the mucosa of the region projects under the vocal cords, and forms two ridges, obstructing the respiratory orifice. Three or four different planes are then formed, from above downwards: the ventricular bands; the mucosa of the swollen ventricle; the red, eroded, or ulcerated vocal cord; and the subglottic

mucosa. When these alterations have deeply invaded the epiglottis, it resembles a shapeless mass, with irregular and anfractuons edges, and is almost immobile. The coloration of the mucous membrane varies according to the general state of the patient—sometimes red, sometimes pale and greenish, and the membrane is often covered by mucus or purulent secretion, which should be removed by coughing or by the cotton-wool mop.

Towards the end of this stage there may supervene cricoarytenoid arthritis, which is distinguished by a peri-articular swelling and immobility of the corresponding vocal cord.

It is possible for arthritis to occur on both sides of the

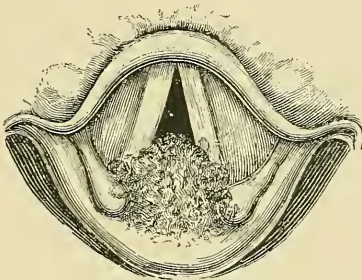


FIG. 123.—TUBERCULOUS LARYNGITIS, WITH DERMO-PAPILLARY PACHYDERMIC DEGENERATION OF THE INTERARYTENOID REGION.

larynx, and then cause asphyxia by glottic stenosis, unless destructive ulceration of the mucosa enlarges the orifice, and permits the air to penetrate into the lungs.

Gougenheim and Tissier have also well described paralysis, (myopathic or by compression of the recurrensts), which may be observed at this period of the affection. The dyspnœic disturbances undoubtedly assume great intensity in this form.

(c) **Vegetative Form.**—In slow and chronic forms laryngeal tuberculosis is indicated by warty tumours, of unequal size and having a large base. These local hypertrophies are sharp-pointed, occupy the interarytenoid space, and project into the glottic cavity, which they partly conceal.



They are either large anfractuous granulations, between which the secretions remain and dry up, or true tuberculous vegetations with a polypoid appearance, which almost entirely choke the glottic orifice. In slight cases it is merely a question of warty lesions of a rosy gray, cuneiform appearance projecting at the level of the posterior wall. These warty growths may also originate on the ventricular bands, the base of the ventricles, or even on the ulcerated cords, constituting true pedunculated polypoid tumours, which closely resemble an ordinary polypus of the larynx, from which they differ by the coexistence of lesions on the posterior region and the concomitant deformity of the organ. These vegetative masses may vary in site, bulk, and appearance, but the posterior region is almost always affected.

This species of fungous interarytenoid tuberculosis appears to the author to be common, not only in former syphilitic patients, drunkards, smokers, in those who snuff or live among dust, but more particularly in the case of those affected with ozænic atrophic coryza or its derivatives.

3. **Tertiary Period.**—The papillary condition of the region being, so to speak, classic in atrophic laryngitis of ozænic origin, it is not surprising to see it even more pronounced in subjects affected with laryngeal tuberculosis of slow development.

Gougenheim and Glover have demonstrated the existence of true tuberculous pedunculated polypi in patients showing only slight signs of pulmonary tuberculosis, and even free from all appreciable bacillary alteration, perceptible by percussion or auscultation.

These tumours usually recur after their removal, and histological examination alone permits of their tuberculous nature being recognized.

This stage, in which the disease is practically hopeless, is characterized by caries and necrosis, the various lesions blending together. This is the stage of perichondritis following on alterations, which have penetrated deeply, and give rise to necrosis of the cartilages. In some rapid forms the arytenoids and the cartilages of Wrisberg, even a part of the

cricoid, may become necrosed and cast off, whereas in slower forms points of ossification or even true osteophytes are observed, as well as circumscribed or diffused abscesses opening round the thyroid lamina anteriorly and laterally.

Later, one or several external fistulæ, communicating with a part of the necrosed thyroid, are formed. The larynx collapses, becoming completely deformed. The aryepiglottic

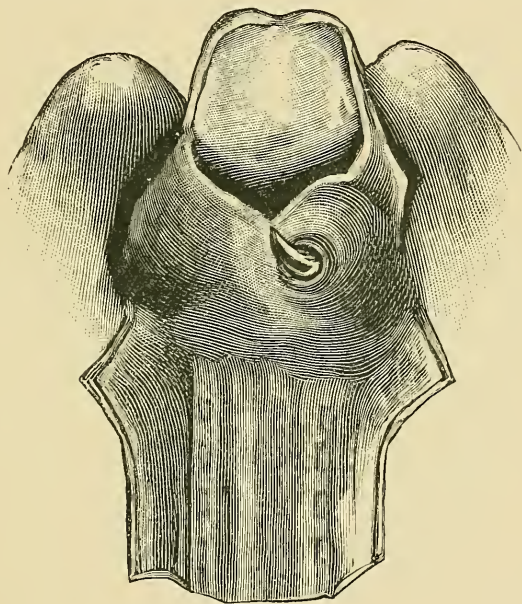


FIG. 124. — TUBERCULOUS LARYNGITIS AT THE THIRD STAGE, WITH PERICHONDritis OF THE POSTERIOR PORTION OF THE CRICOID, AND PRODUCTION OF A TRUE OSTEOPHYTE PERFORATING THE OESOPHAGEAL MUCOSA.

folds are transformed into enormous ridges, covered with extensive greyish miliary ulceration, continuous with the ulceration of the base of the glottis and that of the tongue. The whole organ is filled with greyish, purulent, often fetid secretions, which are ejected with acute pain, and the functional disturbances then attain their maximum intensity. Not only is the patient aphonic, but dysphagia has become so marked, that food is often refused. Respiration is very

painful owing to laryngeal stenosis, and particularly to the breaking down of the pulmonary tissue, and the general state of the patient foreshadows a fatal result.

*Pathological Anatomy.*—Tuberculosis of the larynx does not differ from that of other organs. It is characterized by tuberculous deposits, with tumefaction or ulceration of the mucous membrane. Œdematous infiltration is one of the most constant lesions. It appears after death as a smooth, pasty, indurated swelling, covered with a pale, rough, rugose

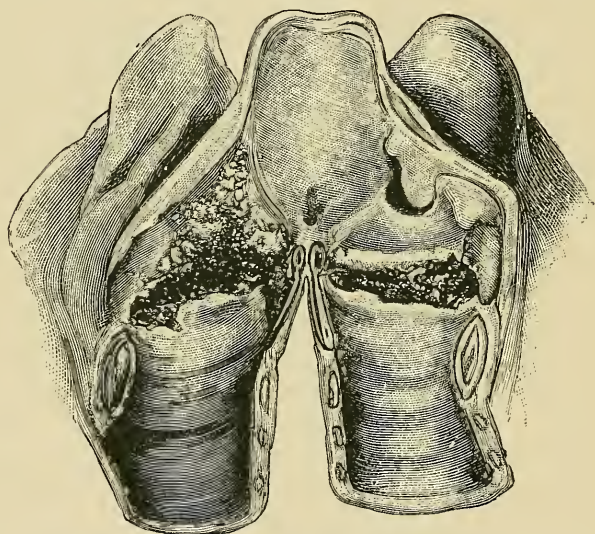


FIG. 125.—APPEARANCE OF AN OPENED TUBERCULOUS LARYNX  
(TERTIARY STAGE: ULCERO-NECROTIC).

mucous membrane, sometimes spread over with caseous granulations. In slow forms the œdema is hard, and the tissues more compact (*sclerema*). Microscopic examination shows under the epithelial layer of the mucous membrane an abundant cellular infiltration. Tuberculous nodules are also found under the epithelium, but not in the tissue situate between the bacillary deposit and the epithelium, which contains rounded cells and many bloodvessels. This suggests that the ulceration takes place from within outwards. Bacilli are rare in tuberculous granulations.

The vocal organs are considerably affected. The glands may be implicated either primarily or secondarily, the tissue surrounding them being destroyed, and the tuberculous infiltration, penetrating between the acini, compresses and causes them to disappear. At the tertiary stage the cartilage itself is more or less ossified or necrosed. The perichondrium contains many purulent cells, surrounding the fibrocartilage, so that it becomes softened and undergoes fatty degeneration, unless it becomes ossified or necrosed.

The coats of the bloodvessels are destroyed by tuberculous infiltration. The muscles are rarely penetrated by tubercle, but are infiltrated by round cells, and their contractile substance is transformed into a fine molecular mass.

The epithelium is sometimes unaffected. Most frequently it is infiltrated, and disappears, laying bare portions of the mucous membrane in which ulceration originates. A tuberculous ulcer is characterized by the presence of tubercles on its edges or base. It may be considered as such, when giant cells are found in it, forming a diffused or circumscribed infiltration in the connective tissue.

Ulcerations vary in form and in size, according to whether they are the result of infiltration or of small isolated miliary tubercles. In the latter case the ulcers are superficial and non-confluent at the outset.

These losses of substance (aphthous patches) are generally found where the mucous membranes are least adherent, and at the level of the ventricular bands and their inferior surface.

In the other forms the ulcers are deep, crateriform, with loose edges, greyish base, and covered with pus, muco-pus, or ichorous secretions. The mucous membrane is punctured with small perforations, 'presenting an ethmoidal appearance' (Schech).

The papillary vegetations, which are observed especially at the level of the interarytenoid region, are usually an integral part of tuberculosis; but it has been proved lately, that they exist in syphilis, epithelioma, laryngitis, sicca, or ozænic coryza.



*Course—Duration.*—The course of laryngeal tuberculosis is very variable.

Generally the vocal lesion follows the evolution of the pulmonary affection. Primary vocal tuberculosis may remain stationary for a long time; but, when the pulmonary lesions develop, the patient may rapidly succumb.

Tuberculous laryngitis is more rapid in younger subjects, especially if any predisposition exists, and is slower between the ages of thirty and fifty.

*Termination.*—In slow forms local lesions may be cured by well-directed treatment, but in those rare cases the patient must be watched for years, as recurrence is very apt to take place. Death usually occurs from aggravation of pulmonary and laryngeal lesions, from emaciation, cachexia, or from glottic stenosis.

*Prognosis.*—With Gottstein, the author believes, that nothing can withstand tubercular onsets of the larynx, when pulmonary tuberculosis is virulent. The existence of ulceration and infiltration is always a grave prognosis, but tuberculous ulceration has been cured by a combined local and general treatment, and sometimes by the latter alone.

As everybody now admits the curability of the disease, the prognosis is less grave.

The diathesis of the patient plays an important rôle, both as regards the disease and its treatment. The natural tendency of the tubercle is to become fibrous, being opposed to cancer in that respect. Each tubercle undergoes two distinct processes—caseation in the centre and fibrosis at the periphery. If the former predominates, the tissue breaks down; but, on the other hand, if the formation of fibrous tissue is complete, recovery ensues from the isolation of the affected area.

When the ulceration is extensive and deep, the case may be considered hopeless, especially if pulmonary lesions are at an advanced stage.

When general nutrition is interfered with, and the affection proceeds by a succession of acute onsets, a fatal issue usually



follows. It must be remembered, that a patient, for years considered cured, may relapse and succumb.

Curable cases seem to be those in which tuberculosis slowly develops, without inflammatory onsets, and in which the local lesions are always isolated.

Death is generally the rule, when the patient has reached the tertiary period.

*Diagnosis.*—The preceding symptoms, although constituting valuable indications, are not always sufficient to determine the diagnosis. In many cases, indeed, examination of the lungs gives a doubtful or negative result. Resort must then be made to laryngoscopic examination, which will reveal persistent anæmia of the vocal mucosa and disturbances of mobility at the onset of laryngeal tuberculosis. In simple catarrhal laryngitis the vocal cords appear rough and reddened, but there is neither swelling nor ulceration at the level of the arytenoid region. The author does not consider the velvety appearance to be symptomatic of bacillosis. The evolution of the malady, its slow but progressive course, its resistance to the usual local treatment, will dispel the idea of simple catarrh.

Persistent redness, with slight infiltration of the arytenoid region, suggests tuberculosis. Syphilis during the secondary period may also cause an erythema, and even erosions, on the edge of the vocal cords; but usually those morbid changes are accompanied by analogous manifestations in the pharyngeal cavity, the tonsils, and the lips, of characteristic roseola, and polyadenitis.

Circumscribed ulcero-œdematous laryngitis cannot be confused with tertiary syphilitic ulcerations, as those usually appear on perfectly healthy subjects, and are accompanied by huskiness of the voice and cough. Moreover, the specific loss of substance is usually painless, or nearly so.

In tuberculosis the ulceration is more superficial, and diffuse, and the infiltration paler than in syphilis. In the latter the swelling is localized in one side of the larynx—often on one ventricular band or vocal cord. The subglottic region is red, and even ulcerated, the posterior portion being spared.

In syphilis tumefaction is rapidly followed by an anfractuous, irregular, even serpiginous ulceration of crateriform shape, with projecting edges, which rapidly gains in breadth and depth if not arrested. In a word, the course of syphilis is quicker, often even rapid, whereas that of tuberculosis, except in the acute form, is slow, and ulcerations, if present, are confined to a part of the larynx.

In diffuse ulcero-œdematous forms diagnosis is generally easier, on account of the extent of the lesions, syphilis being characteristically confined to a part, whence it radiates in different directions. The mode of the formation of those two lesions is also fairly distinct. The tuberculous ulcer begins usually in circumscribed spots, which gradually blend together and form confluent ulcers. In syphilis the loss of substance is usually single, of a more or less extensive area, and gains in depth.

When the epiglottis is affected by syphilis, the base of the tongue, and often the pharyngeal wall, are almost always involved.

To sum up, tuberculosis invades the larynx irregularly and diffusely. Syphilis, on the other hand, is confined as a rule to one half of the larynx, particularly to the ventricular bands and the subglottic region. Yet a syphilitic subject may be affected with tuberculosis, and the symptoms be combined.

Generally the development of tuberculosis in the lungs, and the appearance of other syphilitic changes on the skin and in the pharynx, facilitate the diagnosis. In doubtful forms, curetting of the tuberculous ulcer and bacteriological examination will settle the question.

Vegetative tuberculosis can be confused only with polypi of the larynx, but the latter occur in healthy subjects, and project from a normal mucosa. The polypoid growths of bacillary laryngitis are almost always accompanied by loss of substance, or at least by characteristic infiltration.

In the pseudo-polypoid form histological examination will determine the nature of the neoplasm. The author does not consider it necessary to make a differential diagnosis between ulceration of tuberculosis and malignant tumours. The

latter present such clear characteristics that, at least in the classic form, confusion should never occur.

Vocal paralysis at the outset of tubercular laryngitis might be confused with motor disturbances, consequent on pressure on the afferent nerves or the vagus.

In the latter instance paralysis is almost always unilateral, or at least begins on the one side. Further, it may be observed, that in vocal tuberculosis the swollen glands, or the apex of the infiltrated right lung, compress the nerves of the larynx, and immobilize the vocal cord.

In the last stage of laryngeal phthisis paralysis is due more to a lack of sufficient air to cause vibration of the cords, than to true loss of mobility; yet the degenerated muscles of the larynx may be unable to adduct the cords.

*Treatment.*—Treatment of laryngeal tuberculosis has been considerably simplified of late. General treatment should have the premier place in this, as in pulmonary tuberculosis.

Prophylactic treatment of patients affected with pulmonary tuberculosis should consist of hygienic precautions. The patient should not be permitted to smoke, or stay in rooms with irritating dust or tobacco-smoke. He should use his voice moderately.

When the affection has invaded the vocal mucosa, the air-cure, rest, and overfeeding, should be prescribed and rigorously administered. The air-cure should be judiciously carried out at first, the patient being got gradually accustomed to sleep with open windows.

Local treatment varies according to the stage, and especially to the form of the disease. Each case should be treated according to individual requirements. During the catarrhal stage inhalations of volatile substances, such as balsam of Peru, tincture of eucalyptus, tar, menthol, may be prescribed. The following prescription is recommended:

R Pulverized menthol	...	2 to 5 grammes	gr. 30 to 75
Balsam of Peru	...	4 to 10	„ ʒi to iiss
Tincture of eucalyptus	...	250	„ ʒviii

Put 1 teaspoonful of this mixture in  $\frac{1}{2}$  litre of hot water

for inhalation for five to ten minutes, morning and evening. The inhalations must be at first lukewarm, and then as hot as the patient can bear them.

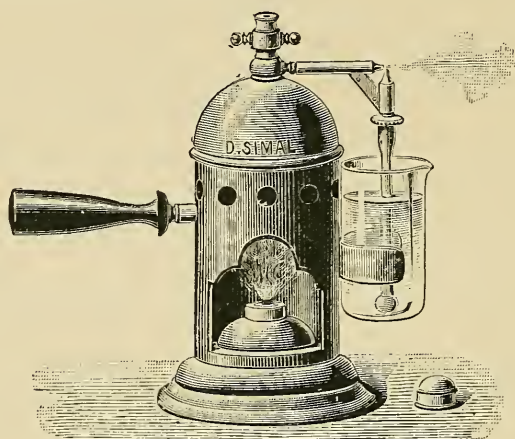


FIG. 126.—STEAM SPRAY (SMALL MODEL).

Sprays of carbolic acid, boric acid, benzoate of soda, borax, etc., may replace the inhalations.

The author generally advises the following formula :

R	Carbolic acid	...	...	6 centigrammes	gr. 90
	Benzoate of soda	...	...	6 grammes	gr. 90
	Tincture of eucalyptus	...	10	„	℥clx
	Glycerine (neutral)	...	40	„	ʒix
	Water (distilled)	...	450	„	ʒxvi

Or—

R	Benzoate of soda	...	6 grammes	gr. 90
	Resorcin	...	4	„ gr. 60
	Glycerine	}	āā 50	„ { ʒxi
	Cherry-laurel water			
	Water	...	400	„ ʒxiv

This is to be used twice or thrice daily, according to the intensity of the inflammation, for five minutes at a time. At this stage any erosions should be touched with solution

of zinc chloride (1 : 50 or 1 : 60) every eight or ten days or so, or silver nitrate (1 : 50, 1 : 30, or even 1 : 20).

Cauterization should be used very occasionally, or avoided, if it irritates the mucous membrane too much.

During the secondary stage in inflammatory forms, treatment should be only palliative and antiphlogistic, and should consist of counter-irritation, blistering, ignipuncture on the side of the larynx, or sedatives, inhalation, or sprays, according to the above formulæ, and, above all, absolute rest of the voice.

If the lesions occupy the glottis or the post<sup>er</sup>ior region—that is to say, if they are extralaryngeal—gargles and throat-washes should be used, according to the following formula, which is both sedative and antiseptic :

R̄ Iodine	)	...	āā 3 centigrammes	āā gr. 5
Iodide of potassium	)	...		
Carbolic acid	...		3 grammes	gr. 45
Laudanum (Sydenham's)		4	„	℥ lx
Glycerine (neutral)	...	150	„	ʒiv

A teaspoonful of this liquid in a glass of tepid water as a throat-wash three or four times daily.

If the gargle is too disagreeable, and does not prove beneficial, the following may be used :

R̄ Carbolic acid	...	...	3 grammes	gr. 45
Bromide of potassium	}	...	āā 5	„ āā gr. 75
Antipyrin	}	...		
Laudanum (Sydenham's), or				
tincture of eucalyptus	...	5	„	℥ lxxx
Glycerine ...	...	150	„	ʒiv

Add a spoonful of this mixture to a glass of tepid water, and bathe the throat daily. If need be, add 0·5 centigramme to 1 gramme of hydrochloride of cocaine as an anæsthetic.

Direct application should be avoided during the inflam-



matory stage, as it is too irritating. At most a small quantity of finely-powdered iodoform, or a pinch of the

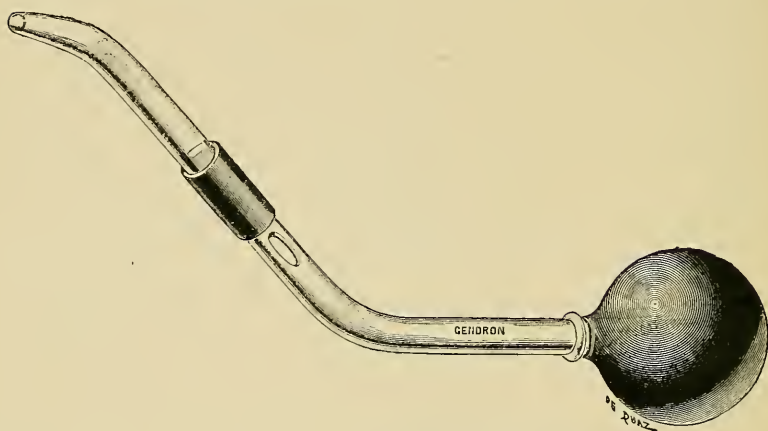


FIG. 127.—LARYNGEAL POWDER INSUFFLATOR. (MOURE.)

following powder can be used as an insufflation into the larynx :

R Hydrochloride of cocaine	50 centigrammes	gr. $7\frac{1}{2}$
Pulverized menthol ...	1 gramme	gr. 15
Iodoform, or biniodoform	āā 5 grammes	āā gr. 75
Boric acid		

This insufflation should be performed daily or every second day. A solution of iodoformed ether, with a certain quantity

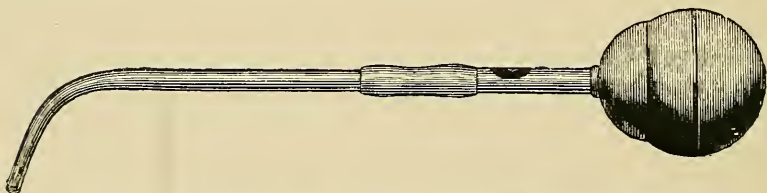


FIG. 128.—METAL OR VULCANITE POWDER INSUFFLATOR.

of menthol, might also be used to disguise the disagreeable odour of the iodoform.

Instillations of oily substances may also be substituted or alternated with the preceding powder.

R	Oleate of cocaine	...	50 centigrammes	gr. 7½
	Guaiacol	...	1 gramme	℥ xv
	Menthol	...	2 grammes	gr. 30
	Liquid vaseline oil	...	60 „	ʒ ii

In the slow and ulcerous forms the antiseptic inhalations and sprays of the first stage could be employed. If dysphagia exists, they may be modified as follows :

R	Hydrochloride of cocaine	25 centigrammes	gr. 4 to 16
		to 1 gramme	
	Antipyrin	} āā 4 grammes	āā gr. 60
	Bromide of potassium		
	Glycerine	... 40 „	ʒ ix
	Spirit of peppermint	... 10 „	℥ clx
	Water (distilled)	... 450 „	ʒ xvi

To be used once or twice daily for five minutes at most.

Cocaine could be replaced either by carbolic acid or beech creosote.

Cicatrization and retrogression of the infiltration areas should be assisted. To that end some specialists recommend a very active local application with nitrate of silver, chromic acid, tincture of iodine, chloride of zinc, in full doses. Others, on the contrary, recommend either total abstention or a mild treatment, believing that caustics are apt to aggravate the disease, instead of effecting a cure.

Astringents are generally more efficacious than caustics. Chloride of zinc and nitrate of silver in weak solution and carbolic acid may be applied in the larynx from time to time.

Ruault has recommended sulphuric acid, neutralized with soda ; but the author prefers glycerine, as it has exactly the same effect, is more easily procurable, is by no means toxic, is anæsthetic, and holds in solution a considerable amount of carbolic acid. This may be used in strengths varying from 1 : 30, 1 : 20, 1 : 10, 1 : 5, or 1 : 3.

Solution of naphthol or salol (1 : 10 or 1 : 15) could also be used, dissolved in soda sulphurinate.

Iodoform and biniodoform in ether solution, or in emulsion with glycerine, have the effect of forming, as it were, a varnish on the surface of laryngeal wounds. Orthoform and the solution of iodine and carbolic already indicated should prove an excellent application.

*Surgical Treatment.*—Krause and Hering have advised surgical treatment of the ulcerated surfaces in tuberculous laryngitis after cocainization of the larynx. The ulcerations

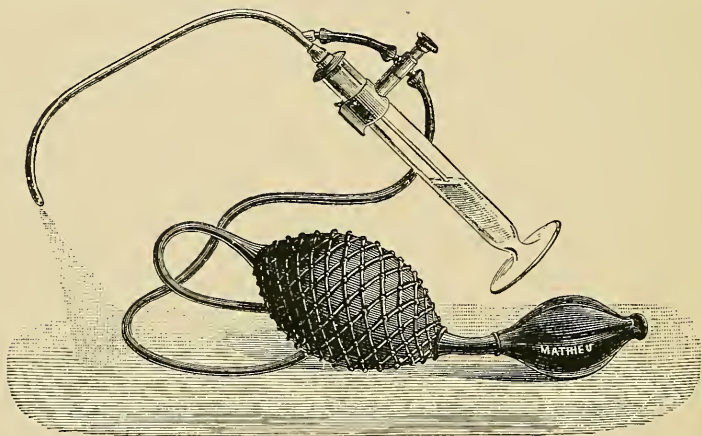


FIG. 129. — INTRALARYNGEAL, PHARYNGEAL, OR NASAL SPRAY, WITH LIOBETT'S ATTACHMENT, SERVING FOR COCAINE, IODOFORMED ETHER, AND OTHER LIQUIDS.

are curetted, and the raw surface energetically swabbed with a solution of lactic acid (1 : 4 or 1 : 3), and then with half-diluted or even pure acid.

Submucous anæsthesia is obtained by means of the following formula :

R Hydrochloride of cocaine	25 centigrammes	gr. 4
Carbolic acid solution (2 : 100)	2.50 grammes	℥xl

Inject 3 or 4 minims in one or two areas, according to the degree of anæsthesia desired. The author is of opinion, that the above formula is somewhat too concentrated.

Hering thought that the preliminary anæsthetization of the mucous membrane was of paramount importance, and that the omission of that precaution was the source of the want of success associated with that method.

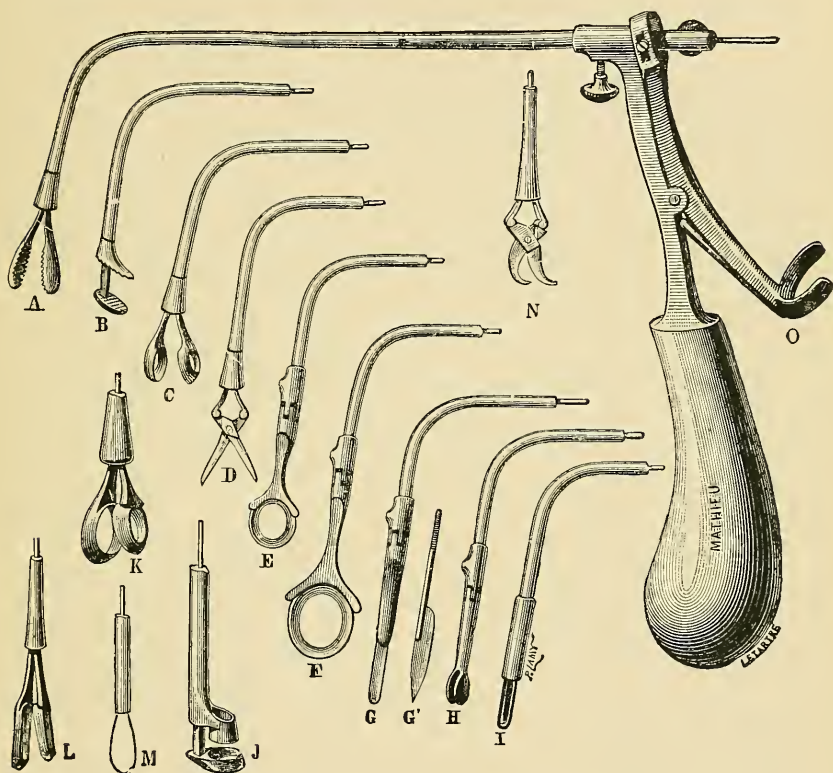


FIG. 130.—SERIES OF LARYNGEAL INSTRUMENTS ADAPTABLE TO COMMON HANDLE.

O, Lever handle; E, small polypotome guillotine; F, large polypotome guillotine; G, G', two scarifiers (pointed and blunt); A, ordinary forceps; B, forceps acting from above downwards; C, cutting forceps; J, punch forceps acting from above downwards; K, L, two punch forceps acting laterally (large and small); H, antero-posterior punch forceps; D, N, two pairs of laryngeal scissors (straight and curved); M, laryngeal snare; I, platinum porte-caustic.

According to the author, lactic acid is an excellent remedy, but is somewhat liable to occasion spasm. It must be used with precaution, especially at the outset.

The results obtained by this special treatment are not so good as those got by varying the local application, or even by complete absence of intervention. The author doubts if

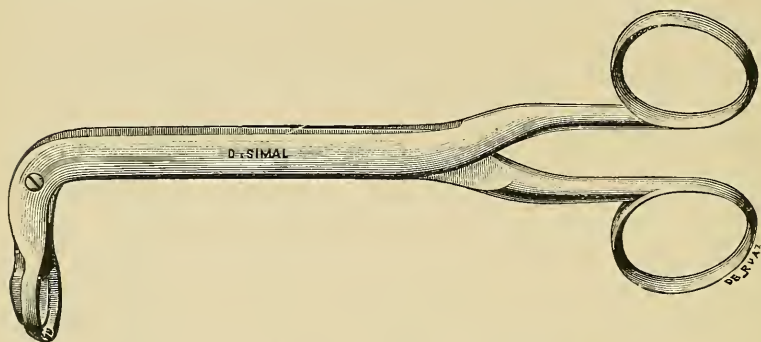


FIG. 131.—MORITZ-SCHMIDT'S PUNCH FORCEPS.

any medicament is efficacious in an infection, so general and variable in its development as tuberculosis. It would be better to modify the receptivity of the soil, than pay too

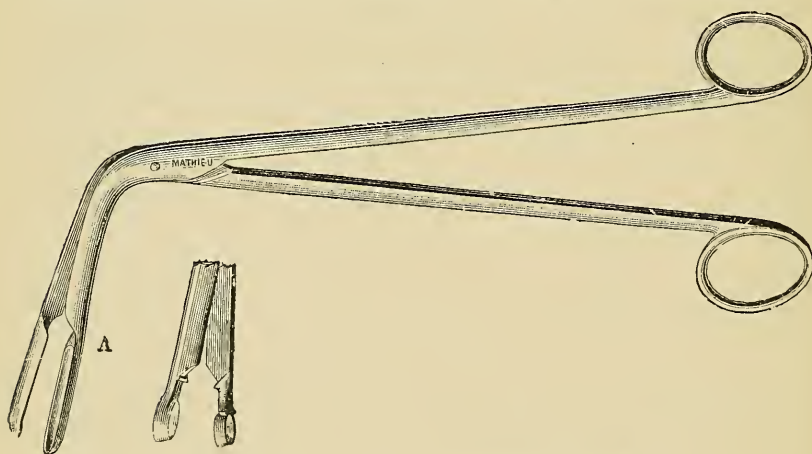


FIG. 132.—GOUGUENHEIM'S LARYNGEAL FORCEPS.

A, Forceps cutting from behind forwards; B, punch forceps cutting from before backwards.

much attention to the local lesion, and thus sacrifice the patient in order to kill the bacillus; whereas the primary aim should be the prevention of the reproduction of the latter.



Moritz-Schmidt has also recommended in the infiltro-œdematous forms scarifications made with special cutting forceps. The posterior part of the larynx and the anterior portion of the œsophagus are grasped between the blades of the instrument and freely cut. This method has obtained good results, but it has not generally been adopted.

Tracheotomy, recommended by Dr. Beverley-Robinson, does not seem to be advisable, as the lungs are thereby handicapped. It should be resorted to only, when asphyxia is imminent.

**Thyrotomy** was favoured by Goris, as it allowed a thorough curetting of the ulcerated surface and energetic cauterization. This method is nowadays abandoned, as it lessens the resistive power of the patient ; likewise extirpation of the larynx is also to be condemned.

To sum up, in a slow form, with limited ulceration coinciding with a comparatively good state of health, the author advises a mild local treatment at the outset, such as painting with weak zinc chloride solution or carbolized glycerine (1 : 10). If the ulceration persists it should be curetted, and carbolized glycerine (1 : 3), or a solution of lactic acid, applied, after anæsthetizing the mucous membrane with adrenalized cocaine.

Should chronic œdema exist in the neighbourhood, local ignipuncture should be resorted to, or, if necessary, resection of the mucous membrane with Gouguenheim's cutting forceps, or use tracheotomy if stenosis endangers life.

If the polypoid form is combined with the ulcerous form, the polypi should be removed with Hering's curette or Ruault's cutting forceps, after cocainization and adrenalization of the larynx. The raw surfaces should be touched with carbolized glycerine or lactic acid.

Solution to anæsthetize the larynx :

R Hydrochloride of adrenalin

(1 : 1,000)	...	...	1 gramme	℥ xv
Hydrochloride of cocaine	...	1	„	gr. 15
Glycerine (neutral)	...	2	grammes	℥ xxx
Water (distilled)	...	8	„	ʒii

In other cases the galvano-cautery may be preferred, and ignipuncture applied to the more projecting parts, and to those which cannot be removed by the forceps. Ruault recommends the preliminary cocainization or adrenalization of the nasal fossæ of patients who are unable to breathe freely, reflex spasm, which sometimes follows brushing of the larynx, being thus avoided.

When the disease has reached the tertiary stage, the sole aim should be to soothe the intolerable pain felt by the patient by the use of bromides, morphia, cocaine, adrenalin, the insufflation of iodoform, etc. The author usually recommends one or other of the following formulæ :

Rx Hydrochloride of morphia	25 to 60 centigrammes.	gr. 4 to 9
Hydrochloride of cocaine	50 centigrammes to 1 gramme	gr. $7\frac{1}{2}$ to 15
Hydrochloride of adrenalin (1 : 1,000)	2 to 5 grammes	℥xxx to lxxv
Pure glycerine	... āā 50     „	{ 3xi 3xii
Cherry-laurel water		
Water	... 400     „	3xiv

To be used three or four times daily for two or three minutes. This should not be swallowed. Rinse the mouth



FIG. 133. — POWDER INSUFFLATOR. (MORITZ - SCHMIDT).  
Glass canula, adaptable to a compressed-air apparatus.

with a little tepid boiled water before meals. Three or four grammes of bromide of potassium, or, better still, of benzoate of soda, or even antipyrin, might be added to the above formula.

Spraying should be of short duration, so as not to fatigue the patient, the mouth being widely opened, and at a

distance of 15 to 20 centimetres from the apparatus. If necessary, a small gag should be used to avoid fatigue.

From time to time a pinch of the following powder should be insufflated into the larynx :

R	Pulverized menthol	...	1 gramme	gr. 15
	Hydrochloride of cocaine		50 centigrammes	gr. 7½
	Hydrochloride of morphia		15 to 30 grammes	gr. 2½ to 5
	Pulverized iodoform	}	āā 6 grammes	āā gr. 90
	Pulverized boric acid			

Or—

R	Orthoform	...	8 grammes	5ii
	Pulverized sugar	...	4 „	5i
	Hydrochloride of cocaine		2 to 5 centigrammes	gr. 3 to 7½

These powders may be replaced by the instillation of a few drops of the following solution :

R	Oleate of cocaine	...	5 centigrammes	gr. 7½
	Hydrochloride of adrenalin		15 to 20 minims	℥ xv to xx
	Guaiacum	...	25 centigrammes	℥ iv
	Pulverized menthol	...	1 gramme	gr. 15
	Vaseline oil	...	15 to 50 grammes	5iv to xii

Before taking food the orifice of the larynx should be painted with a solution of cocaine (1 : 20), with or without carbolic acid or adrenalin.

Before employing extreme doses of cocaine and morphia, the sensibility of each patient should be tested, as in sensitive patients loss of appetite and tendency to lipothymia may occur.

Generally speaking, mild and slow medications, sometimes even abstention, are in many cases the best means of curing laryngeal tuberculosis.

### Acute Miliary Tuberculosis.

A true galloping phthisis of the larynx, which presents in its course some characteristic features. It is distinguished

from ordinary tuberculosis by the existence of bacillary lesions on the mucous membrane, which covers the pharyngeal cavity, the pharynx, the base of the tongue, sometimes even the mouth and lips.

*Etiology.*—It usually appears in tuberculous patients, who have reached the cachectic stage, but more rarely at the outset of the pulmonary disease. It is observed in all ages, more particularly between twenty and thirty-five.

*Symptoms.*—Fever usually begins with the local affection, and lasts to its conclusion. It presents irregular exacerbation, and it is not rare to observe the temperature at  $39^{\circ}$  C., and even reach  $40^{\circ}$  C. or more.

The chief functional symptom is pain on deglutition, which becomes so intense, that it prevents alimentation. There is no other disease of the pharyngeal cavity, where the odynphagia is so acute or lasting.

The lymphatic glands, unlike what is observed in torpid tuberculosis, may be infiltrated, and with pain radiating to the ear. The larynx is painful to the touch only in acute crico-arytenoid arthritis. On the other hand, each movement of the tongue or of the pharyngeal cavity accentuates the pain. Respiration is interfered with only, when the glottic region is inflamed and swollen. The voice is usually dull and aphonic, and respiration short, especially after exertion.

Objective examination shows on the posterior region, and on almost the whole mucous membrane, a series of large superficial ulcers, the edges of which are softened, infiltrated, and spotted over with yellowish granulations, blending gradually into the healthy mucous membrane.

Those lesions are disseminated over the whole surface of the larynx, especially on the epiglottis and its folds, which are swollen and muriform.

The granulations very soon become soft, and leave after them cup-shaped ulcerations, with reddish edges and greyish base, which soon unite to form large superficial purulent ulcers with irregular edges. Those, often numerous, are separated from each other by pale and infiltrated portions of tissue. The

larynx is of a palish or yellowish hue, rather than red, as in cancer and syphilis. The edges of the ulcers show the same yellowish spots, which have characterized the outset of the disease. Usually the infiltration invades the anterior portion of the larynx, specially the ventricular band, the vocal cords, and even the subglottic region. The loss of substance of the larynx is usually continuous with that of the base of the tongue and the pharyngeal cavity. The pharyngeal wall is more rarely affected.

*Course—Duration.*—This form of laryngeal tuberculosis is characterized by its rapid course. Apart from rare cases, in which the disease abates for some time, the patient, exhausted by the pulmonary lesions, the dysphagia, and the pain, usually succumbs to general tuberculosis and the consequent cachexia. This acute miliary form may also occur at the end of ordinary tuberculosis, or after irritant treatment. The author has even seen patients succumbing from vocal lesions prior to the ultimate stage of phthisis.

*Prognosis* of acute miliary tuberculosis is evidently very grave. The existence of fever is always of bad omen. According to Ruault, the gravest cases are those, in which the lungs are invaded, consequent to infection of the larynx and the pharyngeal cavity.

*Diagnosis* depends on the symptoms already referred to. Herpetic laryngitis is also very acute and very painful, but it begins in patients otherwise in full health and is ephemeral. The vesicles are less numerous, and are surrounded by a red zone, without pronounced infiltration of the peripheral mucosa.

*Treatment* is similar to what has been indicated for tuberculosis of the pharyngeal cavity. Sedative applications suitable to assuage painful dysphagia are advisable, and other treatment, such as energetic cauterizations, curetting, etc., should be avoided.

### Lupus of the Larynx.

*Etiology.*—The primary cause of lupus of the larynx is the predisposition of the patient. Hereditary syphilis is also



liable to favour the slow development of tubercle bacilli. Generally speaking, it may be admitted with Homolle, that lupus occurs specially in adolescence, as frequently on the mucous membrane as on the skin. Contrary to general belief, the author thinks, that it is nothing exceptional to find cases occurring in patients over fifty.

*Symptoms.*—In some cases the patient has a scrofulous appearance, prominent cheek-bones, thick lips, glandular involvement, sometimes osseous lesions, chilblains, discharges from the ear, keratitis, etc. In patients affected with lupus of the larynx, of the pharyngeal cavity, or of the skin, the nasal fossæ are affected by a purulent pseudo-atrophic catarrh, a true prebacillary catarrh, from which the germ of infection may originate and inoculate the pharyngeal cavity, epiglottis, or vocal mucosa.

Functional disturbances are generally not very pronounced, and lupus of the larynx may pass unperceived for a long time. It is usually observed in the course of an aural affection, such as otitis media acuta, etc., and of an acute pharyngitis. At other times some patients complain of a feeling of malaise rather than of true pain.

The voice is altered only, when the lesions are seated in the larynx at the level of the interarytenoid region or vocal cords. It then becomes husky, raucous, even lost, sometimes discordant, in consequence of the action of the vocal cords being interfered with by paresis, or by their being partly covered by the ventricular bands.

Cough is not characteristic. It is even rare, being rather a hemming and desire to clear the throat.

Respiration is interfered with only in the hypertrophic forms, the latter causing a stenosis, which is manifested by stridulous breathing, or even by onsets of choking, necessitating sometimes opening of the air tract.

Deglutition is affected only, when there exist lesions in the soft palate or the pharyngeal cavity. It is rarely painful, even in epiglottic lupus, except at the time of acute onsets. Moreover, in patients who have completely lost their epiglottis, the movement of swallowing is made without difficulty.

This fact proves, that the rôle of the epiglottis in deglutition is of less importance than has been usually supposed by physiologists. Its function seems not to consist in covering the glottic orifice during the passage of the food, but rather to direct liquids in the pharyngo-laryngeal channel. The base of the tongue probably fulfils the function of protecting the entrance of the air tract, as during the first movement of deglutition it depresses the glottic operculum on the larynx, or replaces the latter when destroyed. If, in the case of lupoid patients without an epiglottis, food penetrates into the trachea, it is due rather to diminution of laryngeal sensibility and inertia of the muscles of deglutition, than to the absence of the epiglottis. Whenever deglutition takes place in a normal and complete manner, none of those disturbances are observed.

On laryngoscopic examination lupus appears as a reddish swelling, a true infiltration of the mucosa, which slightly precedes the ulceration, or at least the budding, of the affected parts. When lupus is fully developed, there is seen a series of reddish mammillary growths, having a wart-like, uneven appearance, scattered over with greyish spots, the projection and coloration of which gradually disappear at the edges and blend with the healthy mucosa without well-defined demarcation. Those may be supplanted by ulcers, budding at their bases and reaching to the cartilaginous tissue, which is liable in its turn to be affected by perichondritis, caries, and necrosis.

As a rule, lupus commences in the epiglottis, which at first appears swollen and budding, and later on eroded, pale, rosy in places, yellowish in others, while here and there the fibro-cartilage is laid bare. On the edges are seen small irregular projections, true tuberculous lupoid products, hard to the touch.

Fairly often the glottic operculum is completely destroyed, and leaves in its stead a surface rough, thick, rosy or yellowish. The aryepiglottic folds when affected are discoloured, uneven, and rough, covered with bosses, giving them a granular appearance.

It is not rare to find in the interarytenoid region that pseudo-polypoid, pachydermic condition already referred to.

The ulcers when present are not, as in ordinary tuberculosis, covered with profuse exudation, but have, on the contrary, a slight, almost crusty, yellowish layer difficult to remove. This loss of substance occupies either the interarytenoid region, where it forms large rhagades, or the aryepiglottic folds, the ventricular bands, or the vocal cords. Those lesions always present a granular reddish appearance, as if spread over with small projections, greyish or yellowish-grey in appearance. The vocal cords may be more or less eaten into by the ulceration. In that case the organ is invaded throughout, and is pale, muriform, and more or less deformed. Analogous manifestations on the gums, the pharyngeal cavity, lips, or skin, almost always accompany those pronounced forms of laryngeal lupus.

*Pathological Anatomy.*—Lupus of the larynx has been established histologically, and it is proved, that it is a true attenuated tuberculosis.

When treated with alcohol, fixed in paraffin and coloured with picrocarmine, lupoid tissue presents superficial papillary projections visible to the naked eye.

Numerous ridges and hollows surrounded by epithelium are observed on the periphery.

The epithelium forms an area more intense in colour than the remainder of the slide. It is paved, stratified, and composed of many cellular layers, and presents here and there true papillæ. The whole has a uniform coloration. The cells are very vacuolar, and their nuclei are slightly coloured, or even not at all. The external paved layers are extremely thin, and visible only when highly magnified. Deeper down are seen a great many large polyhedral cells, irregularly disposed, constituting the body of the epithelium, the deepest layer of which alone possesses cylindrical cells, with larger nuclei. It is not sharply defined from the subjacent tissue.

The mucous tissue is constituted in some parts by circular rosy zones, separated from each other by connective

tissue. The zones themselves are formed of very fine meshes of connective tissue, in the interior of which are seen a great many necrosed cells without nuclei, and some leucocytes with a high-coloured nucleus. In the middle of the necrosed tissue appear here and there one or more giant cells.

In other areas there are no circular zones, the whole tissue presenting a necrosed appearance, uniformly rosy and spread over with some round cells. Finally certain spots, on the contrary, present a considerable accumulation of round cells.

The vessels are few, the veins are dilated; their walls are very thin, tumid, and varicose. The arteries, which are less numerous, present lesions of endo- and periarteritis.

The preceding conclusions have been corroborated by microscopic examination of a section of a lupoid epiglottis. One of the surfaces was intact, the other infected.

On the intact surface there was no change apart from a slight congestion of the tissue and abundance of leucocytes and endo- and periarteritis. The epithelium was normal, dermo-papillary, with sharply-defined and high-coloured nuclei.

The epithelium of the affected surface was greatly thickened, but its cells were of a pale, bluish colour; most of them, having lost their nuclei, were vacuolar, and the whole of the epithelial layer was hardly distinguishable from the subjacent tissue. Leucocytes were exceedingly abundant, masking in many places the rest of the tissue. Giant cells, round zones of necrosed tissue, surrounded by fibrous rings, were easily observed.

On this surface the perichondrium of the cartilage had disappeared here and there, and round cells had made their appearance in the middle of the cartilaginous surface.

Bacteriological examination rarely shows the presence of bacilli.

To sum up, the results of bacteriological examination are:

( $\alpha$ ) The epithelium persists, although altered at the surface of the mucosa.

( $\beta$ ) Within the submucous tissue necrosed areas are formed, surrounded by connective tissue, which later on will

become thicker and isolate the points of infection from one another.

(γ) The cartilage is destroyed by the disappearance of the perichondrium, dissociation of the cells, and invasion of the hyaline substance by leucocytes.

(δ) The lesion successively extends without causing much inflammatory reaction, as it may leave intact a surface of an organ as thin as the epiglottis, while the reverse surface is deeply affected.

*Course—Duration.*—Lupus in the larynx progresses by successive onsets. The duration of the malady is generally slow, except (which is rare) when acute tuberculosis precipitates a fatal issue. Usually lupus of the larynx, whether isolated or accompanied by analogous lesions in the mouth or on the skin, may endure for years, producing considerable destruction of the throat, nasal fossæ, or the nose, without the lungs being implicated. At all events, the malady terminates either by aggravation of the lesions and general tuberculization (a rather rare fact), or by a temporary or definitive cure.

When the lesion is cured, the ulcers leave usually in their stead cicatricial synechiæ, which may be seated between the vocal cords, the aryepiglottic folds, or even between the base of the tongue and the epiglottis. Laryngeal or pharyngeal stenosis, which may necessitate an operation, may also be a result of lupus. In the most favourable cases cure takes place before the malady has made too great ravages, and consequently without leaving subsequent pronounced alterations.

*Diagnosis.*—Lupus of the larynx must be diagnosed and distinguished from chronic tuberculous laryngitis. In the latter are seen polypoid vegetations seated at the level of the interarytenoid space, hyperplastic erosions, and above all, œdematous, smooth, even, jelly-like infiltration, without the granular appearance of lupus. Besides, confusion of the two diseases would not be of great importance. It is more difficult to distinguish lupus from syphilis. The existence of lupoid changes of the pharyngeal cavity, and particularly



of the skin, will be very beneficial for the diagnosis. When lupus is primary, it is differentiated from secondary syphilis by the presence of roseola. In tertiary syphilis the laryngeal mucous membrane is red, congested, smooth, and even, but not granular, as in lupus. Syphilitic ulceration is deep, crateriform, purulent, serpiginous, sharply defined from the surrounding parts, and has a greyish base, all of which characteristics are non-existent in lupus.

The course of syphilis is progressive, and develops in a few months, if not arrested by specific treatment. Slowness of evolution, on the contrary, is characteristic of lupus.

Leprosy of the larynx might perhaps be mistaken for lupus, but this lesion is exceptionally rare in this country, and is accompanied by alterations in the skin, which preclude doubt.

Till recently the author was of opinion, that differential diagnosis of lupus and cancer was apparent, but he thinks, that in some cases histological examination alone can decide the question, specially if it be epiglottic epithelioma with slow course, as observed in old men, and at its very outset. On the other hand, cancer of the vocal cords, that has attained to the budding stage, with peripheral infiltration, is easily differentiated from lupus.

*Prognosis* of laryngeal lupus is usually benign, if the patient is of sound constitution, and specially if treatment is carried out early. When intervention is too late, cicatricial stenoses, which may be accompanied by grave complications, are liable to occur. Unless the patient becomes, owing to overwork or irritant treatment, favourable to the development of tuberculous bacilli, he may be cured, as lupoid lesions have no tendency to become general.

*Treatment* must be both general and local. Cod-liver-oil, syrup of iodide of iron, iodide of potassium, tincture of iodine, and even iodized wines, along with a rigorous hygienic course, should be prescribed. Locally, applications of caustic or irritant liquids, such as iodized or carbolized glycerine, lactic acid, pure or in solution, should be made. Surgical treatment, such as curetting, scarification, or removal of the

infected parts, should be resorted to reservedly, and often in combination.

The galvano-cautery is also an excellent means of effecting a cure, and of reducing the neoplasms or the diffuse infiltra-

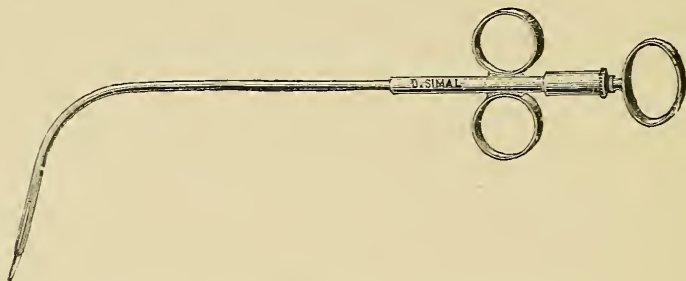


FIG. 134.—SCARIFIER WITH CONCEALED BLADE.

tions which have not been removed by the curette or cutting forceps. Cocainization and adrenalization of the vocal mucosa should, of course, be antecedent. As an additional treatment, an astringent spray, according to the formula

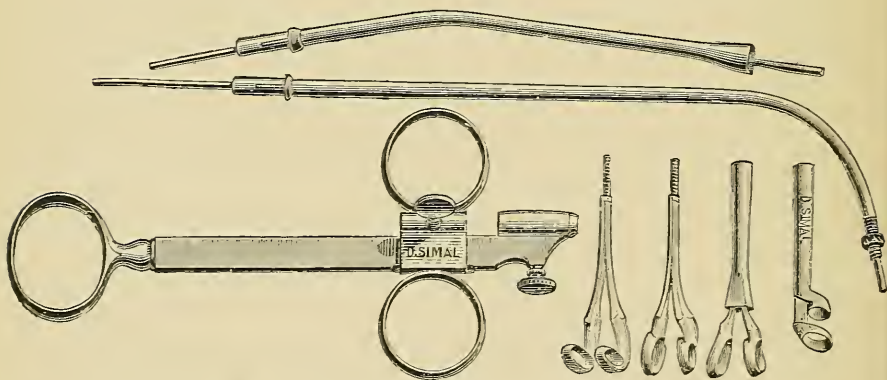


FIG. 135.—CUTTING FORCEPS, WITH KRAUSE'S SLIDING HANDLE.

given in connection with laryngeal tuberculosis, may be prescribed.

Saline, sulphurous, or arsenical waters are excellent means of effecting definitive cure. Once the patient is apparently

cured, he should be examined from time to time, specially in spring and autumn, in order to ascertain that no relapse takes place.

### Leprosy of the Larynx.

Leprosy is rather rare in France. It is to be observed in the leper-houses of Seville, San Remo, Molde, Bergen, Trondhjem, and Reiterdel.

*Symptoms* vary according to the parts affected. Sensibility may be either normal, diminished, or wanting. If the epiglottis is affected, phonation will not be interfered with, whilst if the lesions are situate on the ventricular bands, the aryepiglottic folds, and the cords themselves, there will be vocal disturbances, which, according to Sir Morell Mackenzie, appear from two to eleven years after the first attack. The voice becomes raucous and nasal, owing to the concomitant lesion of the soft palate and nasal fossæ. Then at the last stage of the malady it

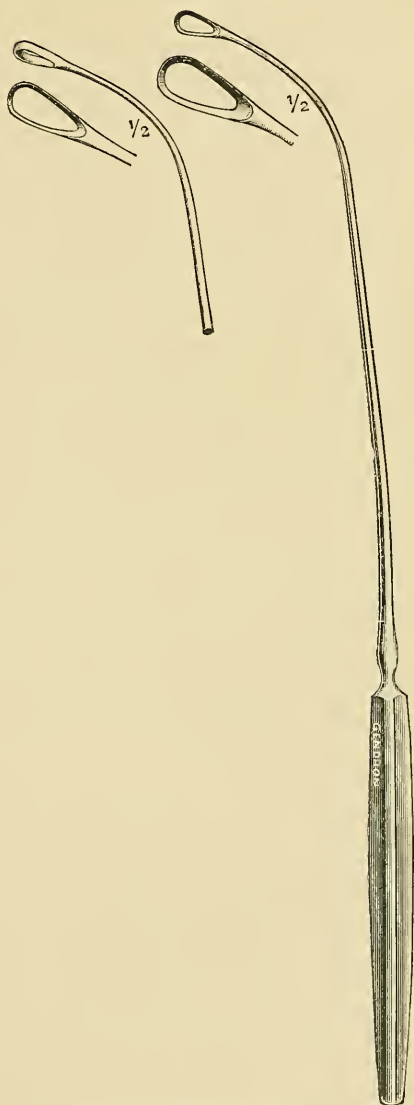


FIG. 136.—MOURE'S LARYNGEAL CURETTES.

assumes a choked or absent timbre. Respiratory disturbances are also in correlation with the degree of tumefaction in the glottic region, and the intensity of inflammatory stenosis. Cough is generally wanting, because the laryngeal secretion is rather diminished, owing to the disappearance of the glandular tissue. As a whole, the functional troubles are but slightly pronounced, and have nothing characteristic.

On laryngoscopic examination, three different stages of laryngeal leprosy may be considered. The erythematous is characterized by a simple chronic catarrh, with pronounced vascularization of the vocal mucosa. The infiltrated stage shows small papillary nodules, very often disseminated in the larynx, generally discrete, resembling, according to Virchow, syphilitic papules. Those morbid changes are so closely allied, that the mucous membrane seems to be infiltrated and thickened. They have sometimes a yellowish hue, a little paler than the healthier parts of the mucosa. Zones of anæsthesia are always present at their level, or surrounding them. At other times inflammatory swelling and infiltration predominate, while the tubercles are rather rare and difficult to perceive. At this stage some muscular paresis is sometimes observed, which interferes with phonation and respiration. During the course of this hypertrophic phase leprosy masses may resemble small excrescences, occupying the aryepiglottic folds or the whole epiglottis, which then assumes the well-known prickly appearance (like the husk of a horse-chestnut).

The tertiary period is characterized by ulceration and necrosis (Gibb, Sir Morell Mackenzie), caused by the liquefaction of the secondary nodules. There may be loss of substance in the cartilage, and the glottic operculum may totally disappear. Adherence between the different portions of the larynx and the base of the tongue and onsets of acute œdema may be observed. As a rule, the patient rapidly succumbs to the progress of asphyxia, if surgical interference fails to dispel respiratory difficulties. Usually manifestations of leprosy are to be found on the uvula, the soft palate, and often even in the pharynx and nasal fossæ.

*Pathological Anatomy.*—Leprosy of the larynx is similar to that of any other organ. According to Virchow, the nodule contains numerous cells of connective tissue, closely united, with free nuclei intervening. Nuclei and cells appear to be grouped around bloodvessels and glands. Generally the epithelium is healthy, except in the ulcerated parts, and the cartilage is almost always normal. As Masini and Thin have demonstrated, the characteristic feature of the lesion is the presence of round cells analogous to blood-corpuscles, which contain one or several bacilli of leprosy. The glandular tissue almost always disappears.

*Course, Duration, Termination.*—The course of leprosy is generally slow. It may endure for years, before it reaches the tertiary period, but it is seldom possible to impede it, even with the best treatment.

*Prognosis* is always grave, but if the affection remains confined to the point of origin, it may not endanger the life of the patient—at least, for several years. When leprosy has attained to the stage of tumefaction and ulceration, the prognosis is fatal.

*Diagnosis* is generally facilitated by cutaneous manifestations precedent to the leprosy. Virchow, however, thinks, that a certain resemblance may exist between leprosy and syphilis or lupus of the larynx. In that case histological examination will confirm the diagnosis.

*Treatment* is usually difficult to apply, and is often useless. The best means consist of hygienic and prophylactic precautions. The patient should be isolated to avoid contagion. Locally, painting with lactic acid, spraying, and curetting of the larynx might be used, with the internal medication usually prescribed for the disease. Most frequently the complications alone are treated, and tracheotomy practised when asphyxia is imminent.

### Neuro-muscular Affections of the Larynx.

There are two chief classes of nervous affections of the larynx—namely (1) neurosis of sensibility, and (2) neurosis of motility.



The first group comprises anæsthesia, hyperæsthesia, paræsthesia, and neuralgia; the second, paresis, paralysis, and spasms.

#### DISTURBANCES OF SENSIBILITY.

**Anæsthesia.**—This functional trouble is mostly observed in hysteria. It appears in the form of zones of insensibility in the larynx and trachea. Chairou and Thaon have demonstrated, that neuropathic anæsthesia is very common in the epiglottis, and not rare in the rest of the vocal mucosa. In typical cases the walls of the larynx, the pharyngeal cavity, and the soft palate, may be titillated without the least reflex. This loss of sensibility is equally met with in emotional patients. Anæsthesia usually accompanies profound narcosis, and is also observed in patients affected with recurrent compression. However, the mucous membrane generally retains its normal sensibility, unless the superior laryngeal nerve is involved.

In some grave diseases (cholera, diphtheria, etc.) loss or perceptible diminution of sensibility is also observed. Anæsthesia of the vocal mucosa is not rare in central affections, especially in bulbar lesions and general paralysis. In dementia this is the cause of the penetration of a bolus or of a foreign body into the air passages during deglutition. It frequently exists among epileptics during the crisis, and for some time after. Hemianæsthesia is also observed during laryngeal hemiplegia of central origin.

*Symptoms* are very often but slightly pronounced. In the central forms dysphagia exists, owing to the loss of motor sensibility of the constrictor muscles of the pharynx. Semi-solid food usually enters the air tract, and causes violent and painful spasms of cough. It is probable, that the penetration of alimentary substances into the trachea is rather the consequence of concomitant paralysis of the depressor muscles of the epiglottis, or of an incomplete movement in deglutition, than of the anæsthesia of the superior region of the laryngeal vestibule.

The patient usually complains of the sensation of a foreign body in the throat.

The anæsthetized parts play the rôle of a true foreign body towards the neighbouring portions, that retain their sensibility.

Thus is explained the sensation of the feeling of a ball in the throat, or the constriction experienced by some hysterical people with an insensible laryngeal mucosa. Anæsthesia is bilateral, rarely unilateral. The seat of the anæsthesia and its intensity is determined by the use of the probe. The patient almost always perceives the sensation of hot and cold, unless a profound nervous disturbance has occurred. The sensibility of the organ may be roughly determined by titillating the vestibule of the larynx with the finger. Laryngoscopic examination reveals no apparent lesion.

*Course, Duration, Termination.*—The course and duration are variable, and depend on the cause of the disease. Anæsthesia of bulbar origin is usually progressive, and prognosis is grave. If it is consequent to diphtheria, it disappears along with the other symptoms of intoxication. Anæsthesia in the tertiary period of tuberculosis, arising from compression or degeneration of the laryngeal nerves, and is incurable unless the compression and degeneration have been of short duration. In hysteria anæsthesia may change its seat, and attack other parts of the larynx or of the body. The course is in such cases very variable, as in all other disturbances caused by this neurosis.

*Diagnosis.*—Certain lesions of the nerve centres begin with analgesia or even total loss of sensibility of the laryngeal mucosa. Whenever food tends to penetrate into the air tract, the patient should be put under surveillance, unless that symptom is obviously due to peripheral causes.

The previous history of the patient should be of importance in recognizing the nature of the nervous disturbances.

In case of need, an electric current introduced into the larynx will furnish precise ideas of the nature and intensity of the anæsthesia.

*Prognosis* varies according to the cause of the disease. Danger lies in the possible penetration of a bolus into

the air tract. In bulbar or cerebral lesions prognosis is always grave. Alimentation may become absolutely impossible, and constant employment of the œsophageal tube be necessary.

*Treatment* should bear first on the general causes of perturbation. In cases of diphtheria recourse should be had to tonics and to electricity applied as Faradic currents, one pole being placed at the nape of the neck, the other on the external region of the larynx, or even in the larynx. Massei and Sir Morell Mackenzie have successfully used continuous currents, the two poles being applied on the vocal mucosa. In such cases the electrodes should not remain long on the same place, in order to avoid the formation of scars. The current must be sufficiently strong to produce a disagreeable sensation, but not pain. In hysteria electricity in all its forms is beneficial.

Strychnine in doses of 5 to 6 or even 8 milligrammes a day, according to the strength of the patient, successfully counteracts neuropathic anæsthesia.

In grave cases of central origin, accompanied by difficulty of deglutition, the patient should be fed with the œsophageal tube.

**Hyperæsthesia.**—As sensibility of the vocal mucosa varies in different subjects, it is difficult to assign precise limits to hyperæsthesia of the larynx. This disease is very pronounced in patients affected with pulmonary tuberculosis, even when the vocal mucosa shows no change. In some grave inflammations of the epiglottis, aryepiglottic folds, or interarytenoid region it may also be observed. Hyperæsthesia is sometimes combined with paræsthesia or neuralgia in hysteria, and is common at the time of dentition, menstruation, or pregnancy.

*Symptoms.*—Hyperæsthesia of the larynx may be localized or diffuse. In the first case the patient has a pricking sensation, which abates on deglutition and reappears some hours afterwards. In diffuse hyperæsthesia the patient feels at the orifice of the air tract a sensation of burning, constriction, or tearing. Some are affected with phonophobia,

refuse to speak, and have an inclination to clear the throat continuously. On direct examination, the mucosa appears quite normal.

*Prognosis.*—The affection is most frequently obstinate and liable to recur. The patient often exaggerates its gravity, yet the prognosis is on the whole benign, except when the hyperæsthesia ushers in tuberculosis.

*Treatment.*—When hyperæsthesia is consequent on any inflammation of the laryngeal mucosa, the treatment consists in counteracting that irritation. When, on the other hand, the larynx is healthy, the treatment should bear on the general condition of the patient, and consist of a sedative course of waters (baths, douches, etc.).

The various bromide salts, antipyrin, and valerian, internally administered, have given good results.

Cocainized solutions are indicated locally. Cold, internally and externally, or moist heat, under the form of compresses often renewed, are excellent remedies. Treatment must, of course, vary according to the patient, and the form and intensity of the hyperæsthesia.

**Neuralgia.**—**Laryngeal Hyperæsthesia** sometimes appears as limited painful areas occurring in crises, and may be regarded as a true neuralgia. This variety of neurosis is considered rare in the larynx. According to Ruault, it is more frequent in women than in men, and occurs specially in neuro-arthritic subjects. Lennox Browne, on the contrary, attributes it to anæmia and incipient tuberculosis. Neuralgia occurs as a reflex symptom in the nasopharynx, or pharynx.

*Symptoms.*—Laryngeal neuralgia is manifested by a series of shooting pains occurring in onsets, usually localized at the level of the great cornu of the hyoid bone, thence radiating towards the ear or the inferior part of the air passage. Speaking or any exertion of the larynx is sufficient to determine its appearance.

*Diagnosis.*—Laryngeal neuralgia must be distinguished from neuralgia of dental origin, from otalgia, and all inflammatory affections of the pharyngeal cavity and the base of

the tongue. The nasal fossæ should also be examined, as their irritation may be the cause of laryngeal neuralgia.

*Treatment* is almost identical with that of hyperæsthesia, and should consist of antipyrin, phenacetin, quinine, even aconite. Cold itself, or combined with methyl-chloride, or preferably warm compresses, are of assistance to subdue the pain.

**Paræsthesia** may originate chiefly in hysteria. It is also met with in hypochondriacs, neurasthenic or syphilophobic subjects.

According to Lennox Browne and Gottstein, this symptom ushers in tuberculosis.

It is also observed in patients who have had foreign bodies in their throat, or have used their voice immoderately.

In naso-pharyngeal lesions it is not rare, and, according to Paul Koch, its existence may be observed in patients affected with minute laryngeal tumours.

*Symptoms.*—The patient imagines the presence of a foreign body (*e.g.*, fish-bone) in the larynx. Sometimes he experiences the sensation of a strong constriction of the throat.

Paræsthesia is differentiated from neuralgia by the fact, that it disappears during deglutition and even for an hour or two after meals, and then reappears as intense as before. Laryngoscopic examination is negative, the mucous membrane appearing quite normal.

*Course, Duration, Progress.*—Paræsthesia is more tenacious than the other preceding forms of neurosis. It is frequently combined with anæsthesia, and its duration depends on the nature of the disease, of which it is a manifestation.

*Diagnosis.*—This affection cannot be confused with the pain occasioned by the presence of a foreign body in the larynx, for not only laryngoscopic examination, but a whole series of manifestations preclude all doubt.

It must, above all, be ascertained, whether there exist general causes—tuberculosis, anæmia, hysteria—or chronic local lesions of the base of the tongue, the pharynx, and



the nasal fossæ, which might explain the existence of paræsthesia.

In neurasthenic people, who believe that they are affected with tuberculosis, cancer, syphilis, the very existence of paræsthesia is of assistance to determine the diagnosis of general neurosis.

*Prognosis* varies according to the causes of the affection. It is usually benign, and the malady rarely resists a well-directed general and local treatment. However, it is very apt to recur under the influence of the least emotion, or of the causes which determined its first appearance.

*Treatment* must bear first of all on the general condition of the patient, and varies according as paræsthesia is accompanied with diminution or exaggeration of laryngeal sensibility. In the former case, general tonics—*e.g.*, arsenic, kola, strychnine, valerian, physical exercise—should be prescribed. In the latter form, bromides are preferable.

Hydrotherapy (cold or lukewarm douches) is beneficial in both forms of paræsthesia.

In the application of local topics, hyperæsthetic and anæsthetic forms must be carefully distinguished. In the former case, preparations with a cocaine base may be employed as a spray, gargle, paint, or wash. The author recommends the following formula :

Rx Hydrochloride of cocaine	... 25 to 50 centigrammes	gr. 4 to 8
Tincture of opium (Sydenham's)	1 gramme	℥ xv
Bromide of potassium	... 2 grammes	gr. 30
Glycerine (pure)	... 30 „	ʒvii

To be used for painting the posterior part of the throat or the orifice of the larynx.

In the latter case, cauterization of a small part of the pharynx with crystallized chromic acid, or better still, with the galvano-cautery, is more suitable in paræsthesia with anæsthesia ; mentholated solutions (1 : 30 or 1 : 50) are also useful.

Electricity, in whatever form, is applicable to both kinds of

paræsthesia. Regular physical exercise (but not to excess) and travelling are also of value. Cure may be obtained in many cases by suggestion.

#### DISORDERS OF MOTILITY.

Before attempting the study of muscular paralysis of the larynx, it is advisable to say a few words on the anatomy and physiology of the laryngeal muscles. They may be classified into two main groups—adductors and abductors.

The first group comprises all the muscles of the larynx, with the exception of the posterior crico-arytænoidei, which are the only abductors.

These various muscles are innervated by: (1) The superior laryngeal nerves, which divide in two branches—the one internal and sensory, the other external and motor—inervating the crico-thyroid. (2) The inferior laryngeal (right and left recurrent), two in number, one on each side. That on the right, originating in the pneumogastric, winds round and under the subclavian, and ascends along the trachea, distributing itself among the muscles on the right side of the larynx, the crico-thyroid being excepted. That on the left is somewhat longer than the foregoing, and passes under the aortic arch, around which it coils, and subsequently proceeds between the œsophagus and the trachea. It innervates the muscles of the left side. The difference of the course of those two nerves explains the diversity of the pathogenic lesions of paralysis of the right and the left. (3) A third nerve, the spinal accessory, contributes to the innervation of the larynx, as the internal branch of this nerve, after leaving the skull, anastomoses with the pneumogastric, which itself furnishes the superior and inferior laryngeal nerves. This branch of the spinal accessory has for some time past been regarded as the nerve of phonation, because when it was torn at its point of origin, aphonia ensued. Other physiologists think, that it is impossible to cut this nerve without injuring the pneumogastric at the same time. This classification of the laryngeal nerves has

long been a subject of discussion, and it is nowadays admitted, since the discoveries of Exner, and chiefly of Onodi, that there exists anastomosis between the fibres of the recurrent and those of the superior laryngeal, which might explain, how the inferior laryngeal contain sensitive fibres, borrowed from the superior laryngeal.

The motor disturbances of the larynx may be divided into several chief groups, which must be described separately : (1) paralysis from central causes ; (2) paralysis dependent

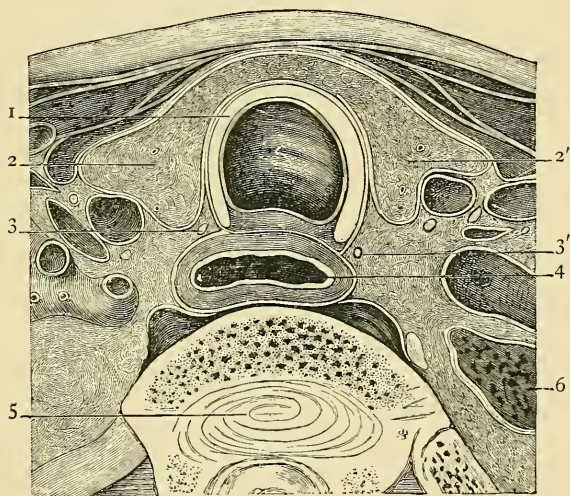


FIG. 137.—TRANSVERSE SECTION OF THE NECK AT THE LEVEL OF THE FIRST DORSAL. (AFTER ZIEMSEN AND BRAUNE.)

- 1, Wall of the trachea ; 2 and 2', thyroid body ; 3 and 3', right and left recurrents ; 4, œsophagus ; 5, vertebral body ; 6, apex of the right lung.

on a lesion of the vago-spinal branches—laryngeal superior and inferior ; (3) paralysis localized in a single muscle of the larynx ; and (4) spasms of the laryngeal muscles.

#### A. PARALYSIS OF CENTRAL ORIGIN.

The central lesions, which may cause laryngeal paralysis, are very numerous. They are diffuse sclerosis, progressive bulbar paralysis, tabes, syphilis at the tertiary period (cere-

bral gumma), syringomyelia, and sclerosis *en plaques*, to which Sir Morell Mackenzie adds a certain number of intoxications (saturnism, etc.). Although Gibb considers unilateral paralysis as fairly frequent in patients affected with hæmiplegia caused by recent apoplexy, the author's experience does not confirm that theory.

*Symptoms.*—The symptoms of laryngeal paralysis of central origin are not characteristic, the general disturbances being the more prominent. The modification in the motility of the muscles varies according to the extent of the bulbar lesion. The paralysis may be double and complete, or, on the contrary, unilateral. Usually the paresied vocal cords lie in the middle line, as has been noted by Semon and others.

Along with Lannois, the author admits, that vocal disturbances are most frequent in labio-glosso-laryngeal paralysis. Charcot has described a defect of adduction of the cords, which explained their aphony. Laryngoscopic examination alone determines the nature of the lesion, which produces the vocal disturbances. Here it is a comparatively trivial symptom, but otherwise in the case, where the two vocal cords are fixed in the mesial line, direct examination permits of therapeutic deductions being drawn.

*Pathological Anatomy.*—The lesions observed on autopsy are very variable, depending on the cause of paralysis. In a case recorded by Sir Morell Mackenzie there was degeneration of the medulla oblongata, which appeared soft and grey. In another recorded by Penzold, the olivary bodies were badly defined, and the anterior pyramids had a grey, gelatinous appearance. Cruveilhier has seen grey degeneration of the posterior cords and of the restiform bodies. A considerable attenuation of the pneumogastric branches (spinal and recurrent) at their origin, a focus of softening in the left restiform body, and a grey degeneration of the posterior cords, have also been noted. In one case described by Luys there were discovered on the protuberance, on each side of the mesial line, minute areolar foci, containing a serous fluid, this lesion being accompanied by secondary degeneration of the recurrent nerves and of the laryngeal muscles.

Seguin, on the contrary, observed on the third right frontal convolution a yellow elastic patch, affecting only the grey substance, and found on that autopsy the existence of a cortical laryngeal centre at this level. The question has been debated by Krause, Massini, and more recently by Semon and Horsley, and others, but as yet the existence of a centre has not been definitely established.

*Diagnosis* is based more on the examination of the patient, the manner in which the paralysis has taken place, and on the accompanying symptoms, rather than on laryngoscopic examination. The mirror only reveals whether the cords are in the middle line (paralysis of the posticus, with contraction of its opponent), in the cadaveric position, or in forced abduction, the last being very rare.

*Course—Prognosis.*—Both vary according to the cause of the paralysis. The paralyzed vocal cord may entirely recover if the paralysis is due to cerebral hæmorrhage; yet, even in the most favourable cases the voice rarely resumes its normal timbre. When paralysis is bilateral, an amelioration, which is more apparent than real, is often seen. Indeed, in cases where paralysis of the dilators, with contraction of the adductors, causes respiratory disturbance, the cords may be seen to travel from the middle line, and assume an almost cadaveric position. Respiration then becomes easier, not because the malady has retroceded, but because, the muscular atrophy having progressed, the contraction of the adductor muscles of the vocal cords has gradually disappeared, and with it the respiratory disturbance.

*Treatment* will be that of the dominant lesion—the cause of the laryngeal affection.

## B. PARALYSIS OF PERIPHERAL ORIGIN.

1. **Vago-spinal Paralysis.**—*Etiology.*—Owing to the length of the tract traversed by the pneumogastric, and to its particular position in the neck, it is easy to understand how it may very often be affected. It is sometimes implicated in lesions of the neighbouring parts—*e.g.*, the large bloodvessels (the subclavian on the right, and the



aorta on the left), the œsophagus, the trachea, the thyroid gland, and the lymphatics. Thus certain aneurisms, malignant degenerations, glandular hypertrophies, are apt to press

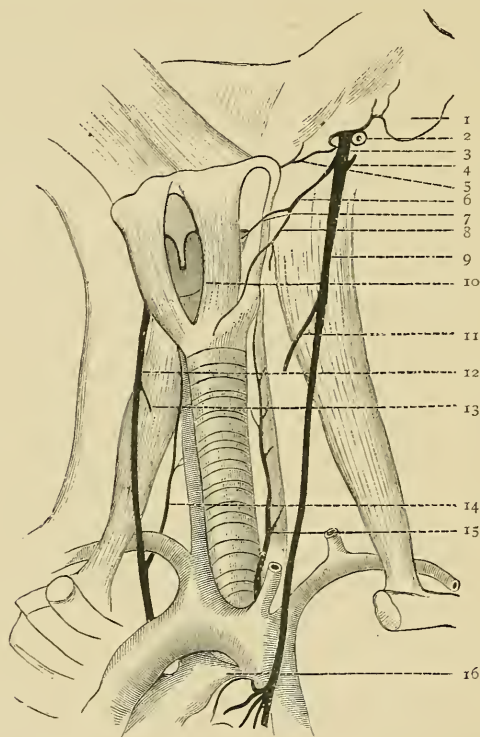


FIG. 138.—RELATION OF THE PNEUMOGASTRIC AND LARYNGEAL NERVES.  
(AFTER ZIEMSEN AND HENLE.)

- 1, Mastoid apophysis; 2, jugular vein; 3, ganglionic plexus of the pneumogastric; 4, internal branch of the spinal; 5, pharyngeal branch of the pneumogastric anastomosing with the pharyngeal branch of the glosso-pharyngeal; 6, superior laryngeal nerve; 7 and 8, internal and external branches of the superior laryngeal; 9, left pneumogastric; 10, thyrohyoid muscle; 11, cardiac branch of the pneumogastric; 12, right pneumogastric; 13, right cardiac branches; 14 and 15, right and left recurrenents; 16, course of the vein.

on the vagus. The tissue of the nerve may be injured by incidental wounds, or during operations in the neck.

*Symptoms.*—The symptoms accompanying lesions of the pneumogastric are of two kinds: (1) cardiac disturbances,

which usually rapidly disappear from the compensatory action of other nerves; (2) vocal modifications (aphonia or hoarseness). Those disturbances are variable, according as the lesion bears on one or both nerves, and as they are partly or totally affected.

On laryngoscopic investigation, the vocal cord appears as in recurrent lesions. However, the pneumogastric being a mixed nerve, its compression determines immobilization of the two cords almost in the middle line, the one being paralyzed, and the other in reflex contraction. Consequently vocal disturbance may be slightly pronounced, whereas respiration may be considerably interfered with, and suffocation and even asphyxia take place if tracheotomy is not performed.

Respiration is stridulous and loud during both inspiration and expiration. The noise made by the patient during his sleep is, as it were, characteristic of this form of dyspnoea, and the more so if he is the subject of tracheal stenosis. The free edge of the vocal cords being relaxed, and almost in juxtaposition, produces at ingress or egress of air characteristic sonorous vibrations.

## 2. Paralysis of the Superior Laryngeal Nerve.—

The superior laryngeal nerve is a sensory nerve through its internal, and a motor nerve through its external branch, although Türk has pointed out a case of crico-thyroid atrophy without concomitant lesion of the superior laryngeal.

*Etiology.*—Paralysis of the superior laryngeal is observed as a consequence of somewhat intense, acute catarrhal laryngitis, or of intoxications such as diphtheria. It is also seen in hysteria. Lastly, every lesion affecting the nerve filament at the point of its entering the larynx may cause paralysis.

*Symptoms.*—Two kinds of symptoms are noted: (1) anæsthesia; (2) paretic disturbances. The former is demonstrated by a very careful examination of the larynx, with the aid of the probe.

The loss of sensibility of the larynx is usually accompanied with hypoæsthesia, and often even with anæsthesia, of the

pharyngeal cavity. The patient then complains of feeling a ball in the throat. Sir Morell Mackenzie records disturbances of deglutition.

When one or two superior laryngeal nerves are paralyzed, or in a state of paresis, vocal disturbances, due to lack of function of the crico-thyroid muscles, are observed. The voice is broken. Some sounds cannot even be emitted. During inspiration the vocal cords are lax, intermittent valvular sounds being heard.

On laryngoscopic examination, the vocal mucosa appears absolutely normal; but if the patient utters the vowel *e*, the vocal cords are not pearly, as usual, but flabby and soft, forming a somewhat characteristic undulated line. During strong inspiration the vocal cords form an isosceles triangle with sinuous sides. The absence of parallelism and approach of the thyro-arytenoidean folds may be considered characteristic. It is possible to elevate the thyroid cartilage, and render the cords sufficiently tense to give the voice a normal timbre.

The course of those disturbances depends on their causation, and is quite different, in a central affection, from that occasioned by paralysis *à frigore* or hysterical.

*Prognosis.*—Those paralyzes are not in themselves grave, as they do not compromise the life of the patient. Yet vocal disturbances may be important in the case of professionals. As the orifice of the air tract is in a state of anæsthesia, the food is liable to enter the larynx, and bring about secondary pneumonia or rapid death. These disturbances, happening specially after diphtheria, may necessitate alimentation through an œsophageal tube.

*Treatment.*—In grave cases attention must be devoted to immediate accidents due to defective alimentation. Subsequently, the affected region should be treated with electricity, either by galvanic or faradic currents. A tonic treatment should be prescribed, according to the nature of the paralysis. Strychnine in pill or administered subcutaneously has afforded good results (Simpson, Lennox Browne).

3. **Recurrent Paralysis.**—It is well to recall, that the

larynx has two physiological functions, apparently antagonistic—phonation and respiration. The former is active and voluntary; the other usually passive, reflex, and unconscious. These two contrary movements of the larynx are brought about by two groups of muscles, well differentiated—the dilators and the constrictors. Now, we know that all the laryngeal muscles are constrictors, except the posterior crico-arytænoidei, which alone draw the vocal cords asunder, and assure respiratory functions. Rosenbach has compared these two movements to the flexion and extension of the limbs, but in the latter two different nerves control those two particular motions. In the larynx, on the contrary, one single nerve (the recurrent) innervates both the constrictors and the dilators, and dominates the act of phonation and respiration. It is well to note, that the recurrent is not the only motor nerve of the larynx, as the crico-thyroid is innervated by the superior laryngeal (a direct branch of the pneumogastric).

Another important fact is, that the ary-arytænoideus—the sole odd and mesial muscle—is innervated by both recurrences. The anastomoses of those nerves with the superior laryngeal must also be remembered. At the present time the recurrent is regarded as a direct emanation of the internal branch of the spinal, as Claude Bernard surmised.

On the contrary, phonation must derive its innervation from a higher part of the brain than the respiratory function. Speech is of too psychological a nature not to be derived from a central origin. Various experiments have confirmed this surmise, and seem to prove that the centre of origin is at the foot of the third frontal convolution, encroaching a little on the inferior portion of the ascending frontal. The centre appears to be bilateral, as destruction of the one is not sufficient to annihilate the function of the other, a unilateral excitation having a bilateral effect.

The route of the connecting fibres may be at the level of the external part of the 'knee' of the internal capsule. It is well to recall, that a perceptible difference exists between the tracts of the left and the right recurrences, the one

winding round the subclavian, the other round the aortic arch.

Recurrent paralysis is the most important and the most frequent in the larynx. It may be unilateral or bilateral, the former being the more frequent.

*Etiology.*—Paralysis is due, properly speaking, to three causes: (1) central origin; (2) peripheral; (3) toxic or infectious. The first variety is usually caused by the various central lesions already referred to. The second are due to lesions occupying one of the sides of the mesial line, which may cause irritation or compression of one of the recurrences. Through its anatomical situation the left nerve is more exposed than the right. Aneurisms of the aorta more particularly affect the left nerve, and are frequently revealed by laryngeal examination.

Dieulafoy has described, as aneurisms of a recurrent type, small dilatations developed at the level of the aortic arch, and causing recurrent compression, with loss of movement in the corresponding vocal cord. The vascular dilatation may be so developed itself, or may emit secondary diverticula sufficient to compress the right recurrent and cause bilateral paralysis. Such cases have been noted by Munck, Sir Morell Mackenzie, Cartaz, Dezga.

The right recurrent is exposed from its situation to changes due to dilatations of the subclavian, and especially to induration of the apex of the corresponding lung.

Sébileau some time ago demonstrated the intimate relationship between the apex of the lung and the right inferior laryngeal nerve—a relationship which varies according to the subject.

The other causes liable to produce recurrent compression, such as tumours of the œsophagus, especially cancer, tumours of the thyroid, fibrous or malignant goitre, and specially hypertrophy of the cervical or bronchial glands, may equally affect both sides, as the relationship of the inferior laryngeal nerves with those organs is almost identical.

In this connection it is well to recollect, that along the trachea exists a multitude of glands, to which Gouguenheim,



Barety, and Leval-Piquechef have drawn attention. Barety distinguished two groups of tracheo-bronchial glands, one to the right and the other to the left, occupying the obtuse angle formed by the trachea and its two branches, and a third group at the level of the tracheal bifurcation, and finally interbronchial glands situate at the divisional angle of the first four ramifications.

In the pathological condition those glandular masses are sometimes united to each other by intermediary glands, which explains how hypertrophy of those lymphatic glands may cause compression of one or even two recurrents, and the alterations resulting from them. Similarly may be explained the series of convulsive coughing in the first period of infancy, and even certain paralyses or transitory constrictions in the secondary period of syphilis.

Pneumonia of the right apex and pericardial effusion may produce compression. Bäumlér records a case where effusion has given rise to paralysis of the two recurrents.

Left recurrent paralysis is also met with, but very exceptionally, in the course of pleuro-carcinomatous effusion on the left side. In an instance mentioned by Unverricht the inferior laryngeal was compressed by a cancerous mass situate at the level of the loop, which this nerve describes round the aorta. The author even goes the length of deducing from that fact, 'that in a pleural effusion, suggesting for some reason carcinoma, the cancerous nature of the effusion can be diagnosed, when paralysis of the corresponding vocal cord supervenes.'

Cases of paralysis of the two recurrents, consequent on compression of only one pneumogastric, have also been mentioned; but it is more logical to admit, with Gottstein, Semon, and others, that the continuous irritation of the pneumogastric finally brings about central disturbances, which give rise to bilateral paralysis.

Among secondary causes with action confined to a muscular group is hysteria, which preferably attacks the constrictor groups of both sides, but may also act only on the dilators, and sometimes on one side of the larynx.

Lead-poisoning, diphtheria, typhoid fever, syphilis, rheumatism, and probably influenza, are the principal toxic causes of recurrent unilateral, or more often bilateral, paralysis.

Cholera, tuberculosis, etc., have also been suspected.

During the course of the various general affections there may be observed a true peripheral neuritis of the recurrent, or of the filaments which ramify in the muscles of the larynx. This neuritis may be attributed to a mere chill (rheumatic subjects), or to one of the general affections already referred to. This peripheral neuritis is also met with in tuberculosis.

Sex does not appear to have any influence on the frequency of the lesion.

The cause of the paralysis may escape the most careful examination. The author has observed paralysis of the larynx in ozænic patients with laryngo-tracheal complications. It seems, that in some cases the laryngeal muscles have partly lost their normal tonicity, probably owing to a tropho-neurotic disturbance of the terminal ramifications of the two laryngeal nerves (superior and inferior), as paresis is almost invariably accompanied with marked hypoæsthesia, to which is due the accumulation of crusts in the laryngo-tracheal tract.

### *Symptoms.*

(1) **Double or Bilateral Paralysis** is distinguished by very clear functional symptoms. The voice is stifled or even lost. Coughing is likewise aphonic, masked, or raucous. The patient is often incapable of coughing or expectorating, owing to the extended dimensions of the glottic orifice, which does not form a *point d'appui* for the accomplishment of those actions.

The vocal cords may be fixed in the middle line, if the lesion is recent. In that case marked stertorous and laboured breathing exists on inspiration and expiration, more noticeable during sleep. If there is complete paralysis, the respiration is comparatively easy, except during exertion. In these cases during forced phonation or coughing there occurs what Ziemssen calls 'leakage of air': the two vocal cords being unable to adduct closely, the air filters through

the space between them, producing that characteristic aphonic sonorous sound. During forced inspiration no true dyspnœa exists, but a kind of vibration is heard, due to the adduction of the free edges of the cords, which are drawn towards the inferior part by the passage of the air penetrating into the bronchi.

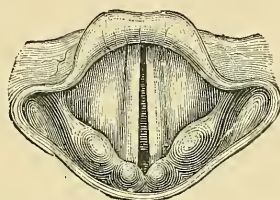


FIG. 139.—POSITION OF THE VOCAL CORDS DURING INSPIRATION IN BILATERAL PARALYSIS OF THE DILATORS. (RECENT LESION.)

On laryngoscopic examination, the position of the cords varies, according as the lesion is recent and incomplete or old and complete. In the former case the cords are in the middle line, while, when the action of the two recurrensts is destroyed, the cords assume an intermediary position between phonation and respiration (called the cadaveric position), yet the cords are not so far apart as after death. Some authors

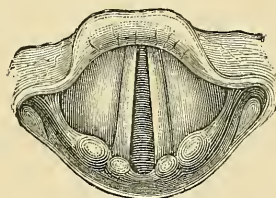


FIG. 140.—POSITION OF VOCAL CORDS IN BILATERAL PARALYSIS OF THE DILATORS. INTERMEDIATE OR CADAVERIC POSITION OF THE CORDS DURING INSPIRATION. (OLD LESION.)

think, that the normal tonus of the crico-thyroid, innervated by the superior laryngeal, is sufficient to give the cords a certain degree of tension, which prevents them assuming a true cadaveric position. They are dull, almost grey, leaving between them an ellipsoidal space, whose edges are not clearly defined. When the patient is requested to take

a deep inspiration, the free edge of the vocal cords is seen to be depressed in a downward direction. The arytenoids remain immobile during movements of respiration, as well as during attempts at phonation. The above symptoms are characteristic of complete and bilateral paralysis of the two recurrent nerves in adults. In children the middle of the

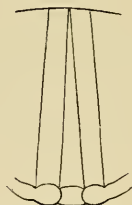


FIG. 141.—DIAGRAMMATIC APPEARANCE OF THE IMMOBILIZED CORDS IN THE CADAVERIC POSITION. (SEEN DURING INSPIRATION.)

glottic orifice is so small, that the immobilization of the arytenoids in an almost mesial position is sufficient to interfere with respiration, and in those cases a more or less pronounced dyspnoea is observed.

(2) **Unilateral Paralysis.**—The vocal disturbances are quite different, when paralysis is merely unilateral, though complete. The voice becomes bitonal, assuming a special timbre. Most frequently the opposite cord, owing to

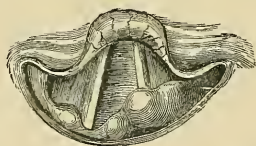


FIG. 142.—COMPLETE PARALYSIS OF THE LEFT RECURRENT. (SEEN DURING STRONG INSPIRATION.)

The cord on this side is in the cadaveric position.

exaggerated contraction, comes almost in contact with the paralyzed cord, and allows the edges of the vibratory part to produce a certain sound. At other times the voice is without any timbre.

The 'leakage of air' characteristic of bilateral paralysis

only exists during efforts. Respiration is normal, because the unaffected side is quite sufficient to ensure respiration.

Consequently, laryngoscopic examination alone will almost settle the exact diagnosis of the lesion, by showing a vocal cord immobilized, either in the middle line, or in a position intermediate between phonation and respiration (cadaveric position).

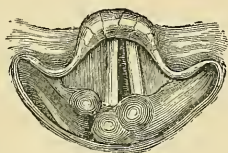


FIG. 143.—THE SAME LARYNX AS THE FOREGOING. (SEEN DURING EFFORTS OF PHONATION.)

The right arytenoid and the corresponding cord, which are intact, pass beyond the middle line, so as to compensate for defect of action of the paralyzed vocal cord.

From the very fact, that one of the vocal cords has lost its movement, and the other has acquired an exaggerated mobility, the glottic orifice appears contorted; the arytenoid cartilage of the healthy side overlaps the medial line, to come in contact with the opposite side, and, even if the paralysis

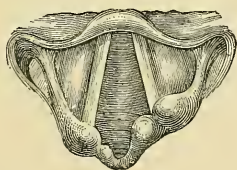


FIG. 144.

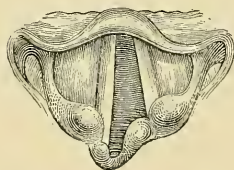


FIG. 145.

Paralysis of the left cord in external position; larynx seen during inspiration (Fig. 144) and during efforts of phonation (Fig. 145).

is old, encroaches over it. The paralyzed cord seems to be shorter, and placed in a superior plane to its fellow.

Generally, when the compression is recent, the corresponding cord, or both cords if the lesion is bilateral, occupy the middle line, because the nerves being irritated induce contraction, and the action of the constrictors is stronger than that of the dilators. If the nervous alteration is graver and



unilateral, the paralyzed cord is still fixed almost mesially, both by the crico-thyroid, which, being innervated by the superior laryngeal, is not affected, and also by the ary-arytænoideus, which still gets its innervation from the intact recurrent. Thus, even the complete suppression of the recurrent on one side is not sufficient to put the corresponding cord in a true cadaveric position.

*Summary.*—If the lesion of the recurrent is unilateral at the outset, when the nerve is simply irritated, the corresponding cord is fixed in the middle line, voice and cough are almost normal, respiration is free. When paralysis is complete, all nervous influx being suppressed, the cord takes a position slightly apart from the middle line, a position intermediate between phonation and the true cadaveric position. The voice and cough are then bitonal, with a special almost eunuchoid timbre.

If the compression of the recurrent is double at the stage of irritation, the cords occupy the middle of the glottic orifice; the voice is then normal, cough somewhat muffled, the respiration being stridulous and stertorous. The patient experiences a sensation of suffocation.

When paralysis is complete, the cords are slightly abducted from the middle line, aphonia exists, cough is suppressed; during phonation a leakage of air occurs; respiratory disturbance, at least in adults, appears only during exertion.

*Pathological Anatomy—Pathogenesis.*—In 1881 Semon, resuming the researches of Rosenbach, tried to demonstrate that, if one recurrent is suppressed, the corresponding posterior crico-arytenoid muscle was always first, and often the only one, paralyzed (whence the mesial position of the corresponding vocal cord); then, when the function of that nerve was completely abolished, either by a long protracted compression or by section, the vocal cord assumed the so-called cadaveric position.

To explain that special position of the paralyzed vocal cords in the middle line, Semon thinks that the dilator muscles of the glottis are endowed with special sensibility (posterior crico-arytænoidei), which are often alone or the

first to be affected. Semon's law seems nowadays to be confirmed—at least, in its chief points. Dr. Brockaert, in a very complete and recent work, comes to the conclusion, that in the case of a bulbar lesion fixing the vocal cord in the middle line, the supposition of lesions confined to the abductor muscles alone (Semon) must be admitted. This fact is not surprising, as the phonatory and the respiratory functions are dissociated in the bulb, and this selection occurs in most of the cerebro-spinal lesions.

On the other hand, Brockaert thinks, it is not logical to admit, that the dilator muscle, which fulfils the very important function of respiration, is more vulnerable than the muscles of phonation—an acquired function.

If we admit, that on the cadaver the posterior crico-arytænoidei lose their conductivity quicker than the other muscles of the larynx (Semon, Lermoyez), it does not follow, that during life they are in a state of inferiority, for over-work may account for their more rapid death.

According to Brockaert, in the case of recurrent lesions *the abductors resist longer than the other muscles of the larynx, owing to the fact that they receive trophic fibres from the sympathetic.* This additional nervous supply explains their stronger resistance to degenerative changes.

To explain the medial position of the cords in unilateral recurrent paralysis, Brockaert thinks, that in the bulbar lesions, if the nucleus of the posterior nerve alone is affected and destroyed, a contraction of the antagonistic muscles occurs, which may persist. This contraction conforms with our present pathological knowledge.

If the lesion is peripheral, the cord immediately assumes an intermediate position, which he calls that of relaxation.

Should the morbid change be slow, there is at first irritation, which causes adduction of the vocal cord. This irritability may even persist for several months; then the nerve gradually becomes paresed, the nervous conductivity progressively diminishing, until all the fibres are affected by paralysis. The position of the cord depends on the degree of paresis

of the nerve, and is explained by the fact, that the adductors are more numerous and are stronger than the abductors. If this paralysis is complete, the so-called intermediary position (which is not the true cadaveric position) may be explained by admitting a muscular tonus in the antagonists, and particularly in the ary-arytænoideus muscle, whose half only is affected by unilateral compression. The healthy part of this contracted muscle helps to fix the cord mesially; perhaps the crico-thyroid, equally intact, also favours the protracted intermediate position of the cord deprived of the recurrent nerve supply.

*Course — Duration.* — The course and duration of these paralysees vary with their causes. If it is a case of a transitory affection and of short duration, the function of the nerve may be restored. If, on the other hand, the recurrent has been long compressed, and trophic disturbances have supervened in the muscles, the affected cord runs the risk of retaining a vicious position. Vocal paralysis of hysterical origin alone is susceptible of disappearing as suddenly as it appeared. Usually muscular disturbances consequent on an acute affection vanish with the latter. Generally at the outset of recurrent lesions (compression) are observed phenomena of excitation, and contraction, more or less transitory (spasmodic cough, aphonia, etc.). Then, as the nerve filaments are more compressed, progressive motor paralysis takes place, as well as atrophy of the muscles innervated by the affected nerve.

*Diagnosis.* — Diagnosis of the lesion itself is generally easy. Functional disturbances on the one hand, and laryngoscopic examination on the other, permit the nature of the muscular lesions being recognized. On the contrary, it is not always easy to determine the cause of the paralysis. When the left cord is affected, it must be ascertained, whether the compression is due to the aorta, the heart, or to the œsophagus. If it is the right cord, the subclavian, or the lungs, a tumour of the mediastinum, and even of the œsophagus, may be suspected.

In hysteria paralysis is usually bilateral. In inflamma-

tory paralysis the presence of laryngeal catarrh suggests the diagnosis. Finally, when it is impossible to discover the exact nature of the paralysis, the explanation of the phenomenon may be sought in the central nervous system, or in the general condition of the patient. It must be remembered, that in some cases the motor disturbance of the larynx is a premonitory symptom, which for long precedes other disturbances of a bulbar or cerebral lesion. Cicatrices, proceeding from old affections of the larynx, and causing ankylosis of the crico-arytenoid articulations, are revealed by the existence of fibrous adhesions, which are usually visible on direct examination.

Arthritis of tuberculosis and syphilis is likewise accompanied by concomitant lesions, revealing their nature.

Immobility due to neoplasms is always associated with tumefaction of the posterior periarytenoid region, or of the ventricular band, which precludes the hypothesis of a simple paralysis. Care must be taken not to confuse certain glottic spasms, due to the emotion of the patient at the time of the examination of his larynx, with a true paralysis. It will be sufficient to place the mirror in position repeatedly, and to ask the patient to breathe calmly.

In transitory contraction of the adductors the cord is, as it were, shrivelled, its edge concave, the arytenoid being drawn downwards and inwards. The affected cord seems to be shorter than the other. The contracted vocal cord is not only beyond the middle line, but also above that of the other side.

During inspiration the contracted arytenoid remains completely immobile, whereas in unilateral paralysis it undergoes at its top small oscillations due to the integrity of the half of the arytænoideus muscle.

Diagnosis of paralysis is chiefly made by requesting the patient to carry out the movements of phonation and inspiration. An expert will generally recognize it easily.

*Prognosis.*—The gravity of paralysis of laryngeal muscles depends on the cause of the lesion. If the paralysis occupies the two cords, both being in the middle line,

respiration is accordingly involved, and tracheotomy must be carried out to save the life of the patient. Even in hysteria it may be necessary to open the air tract to prevent asphyxia, but such cases, by no means rare, are due to contraction rather than paralysis.

In the case of unilateral lesions life is generally not endangered. Prognosis then depends on the nature and the cause of the laryngeal motor disturbance.

#### ISOLATED PARALYSIS OF THE DILATOR AND CONSTRUCTOR GROUPS.

This is met with almost solely in hysteria. In this case it is bilateral, and extends separately to each of the muscular groups of the larynx.

(A) **Dilators.**—When paralysis attacks the posterior crico-arytenoidei (dilators), the functional and objective symptoms are those of double recurrent paralysis at its outset. The vocal cords, placed in an intermediate position, almost completely block the air passage. The voice is suppressed, and during phonation a characteristic leakage of air is perceived. If the loss of movement persists, tracheotomy should be performed to prevent asphyxia. This form of hysteric disturbance is fortunately rare.

(B) **Constrictors.**—When the loss of movement affects the group of the constrictors, the symptoms are quite different. There is complete aphonia, the patient being unable to adduct his vocal cords, and during efforts of phonation the air is heard passing through the glottic orifice, which is enlarged from the want of adduction.

Cough, when it exists, follows the modification of the voice. It is rather a tracheal 'blowing,' deprived of any sonorous quality. Expectoration is generally nil, and in any case very difficult. The tactile sensibility of the laryngo-tracheal mucosa is almost always changed. Respiration is normal. It is even very easy, as the vocal cords remain in the respiratory position.

If the lesion is unilateral, the voice and the cough are



altered in their timbre, in spite of the compensation supplied by the healthy side.

Laryngoscopic examination during phonation shows, that the epiglottis fails to rise normally, the vocal cords remaining apart from each other. The glottic orifice assumes the appearance of an isosceles triangle, with a posterior base (arytenoid), the lateral edges of which are slightly incurved. From this position it follows, that the two posterior angles are rounded, the anterior alone retaining its regular form.

During inspiration the two thyro-arytenoid folds, abducting slightly, become more rectilinear, and make the triangle more isosceles than during the efforts of phonation.

If the paralysis is unilateral, the glottic orifice appears deviated. One of the cords remains immobile in an external position, whereas the other endeavours to approach its fellow, and almost overlap the mesial line. To this compensation, supplied by the sound side, must be attributed the asymmetrical appearance of the larynx, noticeable especially during phonation. Frequently the ary-arytænoideus muscle, paralyzed on one side, half contracts, causing the arytenoid of the paralyzed side to overbalance, giving the cartilage a deformed look, and making the posterior region appear swollen.

### **Isolated Paralysis of the Muscles of the Larynx.**

—Hitherto we have considered the two muscular groups as a whole, but it may happen, that under certain influences the paralysis is confined to an individual muscle of the larynx. In that case laryngoscopic examination generally shows the paralytic disturbance clearly enough to make the diagnosis easy.

*General Etiology.*—Isolated paralysis of the muscles of the larynx has an etiology almost identical with that of the recurrents. It may be of central origin, occasioned by peripheral neuritis, or consequent on primary myopathy (Sir Morell Mackenzie). It is sufficient to recall the anatomical position of the thyro-arytænoidei or ary-arytænoidei to understand that they may be paralyzed when their mucosa is the seat of a more or less active infection.

Rheumatism may also be confined to a group, or even to a single muscle of the larynx, and cause isolated functional inability of the affected part. Before attributing the paralysis to rheumatism, it is necessary to ascertain, if the lesion cannot be explained otherwise. Finally, it must be recalled, that hysteria is by far the most common cause of isolated laryngo plegia.

**Paralysis of the Lateral Crico-arytænoidei** is fairly rare, although Elsberg has recorded some cases. When the two muscles are affected, the functional symptoms are those of paralysis of the constrictors. The patient is completely aphonic. Respiration is easy, and coughing follows the modification of the voice.

For this reason some authors think, that it cannot be affirmed, that the lateral crico-arytænoidei alone are affected. Laryngoscopic examination shows, instead of the image of the paralysis of the constrictors, a glottic orifice assuming a rhomboid form. On attempted phonation, the vocal cords posteriorly are in contact owing to the contraction of the transverse muscles, but are separated throughout the rest of their extent, which gives the larynx a characteristic aspect. If paralysis is unilateral, one of the vocal cords is perfectly tense antero-posteriorly, overlapping the middle line even during phonation, whereas the other presents the characteristics of paralysis of the lateral crico-arytænoideus, the vocal cord forming an angle towards its posterior third, which at this level remains apart from its fellow.

**Paralysis of the Thyro-arytenoid Muscle —**  
*Etiology.*—To the general causes referred to above must be added acute or chronic inflammation of the vocal mucosa, which is common in speakers, singers, preachers, and rheumatic people, for, owing to its situation, the thyro-arytænoideus is very much exposed to inflammatory paralysis.

*Symptoms.*—The thyro-arytenoidei may be attacked uni- or bilaterally. In complete paralysis the voice is husky, dysphonic, or even diaphonic. If the patient emits two sounds simultaneously, those sounds are almost always in

harmony, and generally at an octave or a third from each other. They are due to the incomplete contraction of the thyro-arytænoideus, and to the union of the cords either in the anterior third or even in the posterior fourth; hence are formed two glottic orifices of unequal dimensions. If paralysis is complete, the voice is broken and aphonic, and in such cases all the vocal modifications are observed, as already recorded under catarrhal laryngitis.

Respiration, on the other hand, is easy. Cough is dependent on the cause of the paralysis. Laryngoscopic examination shows the vocal cords assuming a wavy form, adducted in some places, and leaving in others free, sinuous, and loose spaces. The glottic orifice has an irregular form from the

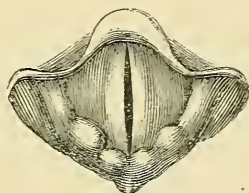


FIG. 146.—DIAGRAMMATIC APPEARANCE OF THE LARYNX DURING EFFORTS OF PHONATION.

The edge of the cords is usually less defined and more wavy.

anterior commissure of the cords to their cartilaginous insertion on the arytenoid.

The edge of the vocal cords is covered with more or less thick creamy mucus, which becomes frothy, and collects on those parts of the thyro-arytenoid folds which come into contact during phonation. If the paralysis is of inflammatory origin, the mucosa is very often rosy, even red and inflamed. It is not rare to find paresis or paralysis of the ary-arytænoidei associated with that of the thyro-arytænoidei.

Finally, on laryngoscopic examination the ventricular bands are often seen during phonation to approach and come in contact in their endeavour to fulfil to a certain degree the function of the true cords.

The muscular disturbance may be more pronounced on

one side than on the other, but it is rare that both sides are not affected at the same time.

*Diagnosis* is generally easy on direct examination. Paralysis of the crico-thyroidi may be mistaken for paralysis of the intrinsic muscles of the vocal cords, but in those cases the cords are simply grey and dull in colour, and do not present that irregular and inflamed appearance which distinguishes paralysis of the thyro-arytenoidei.

*Prognosis* of paralysis of the thyro-arytenoideus varies with the cause producing it. It is grave in professional singers and speakers, as the voice loses its purity and sonorous quality.

**Paralysis of the Ary-arytænoideus.**—The causes of the paralysis of this muscle are those already given in the case of isolated paralysis of the laryngeal muscles.

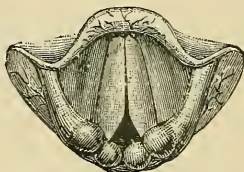


FIG. 147.—DIAGRAMMATIC APPEARANCE OF THE LARYNX IN PARESIS OF THE ARY-ARYTÆNOIDEUS.

*Symptoms.*—Authors are in disagreement regarding the vocal disturbances consequent on isolated paralysis of the ary-arytænoideus. According to Mandl, only the upper register of the voice is lost, while Elsberg maintains that raucity and hoarseness alone exist. The author has always observed absolute aphonia in *complete paralysis*. Although the vocal cords adduct exactly in their two anterior thirds, the patient is as aphonic as in paralysis of the constrictors. It is only when the muscle is merely paresied or half paralyzed; that the voice becomes raucous and not aphonic. It may be stated, that the degree of arytenoid paralysis can be gauged by the modifications of the vocal timbre. Coughing follows the modifications of the voice, and is, according to circumstances, sonorous, raucous, croupous, or aphonic. Deglutition is by no means interfered with. Respiration is normal, but slightly troublesome in children during the night,

owing to the swelling of the interarytenoid mucosa, which in their case often accompanies this paralysis. On laryngoscopic examination, if the practitioner bears in mind the situation of the ary-arytenoid muscle and its physiological function, he will understand the disturbances following on its want of action. If paralysis is complete, the two arytenoids are seen during phonation to remain apart from one another, almost in the inspiratory position. The diagrammatic laryngoscopic image is a glottic triangle, with the base posteriorly, and an apex ascending towards the posterior or anterior third of the vocal cords. Unfortunately, this aspect, apparently characteristic of ary-arytænoideus paralysis, is not seen in practice. There is always observed a kind of exaggerated contraction of all the accessory muscles of the larynx, which shrivels the

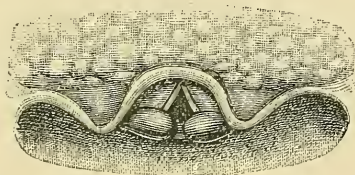


FIG. 148.—APPEARANCE OF THE LARYNGOSCOPIC IMAGE IN COMPLETE PARALYSIS OF THE ARY-ARYTÆNOIDEUS. (MOURE).

organ, and not only raises the ventricular bands above the vocal cords, but also markedly lowers the epiglottis, and makes it almost impossible to see the ary-arytenoid region. The arytenoids are separated during inspiration, while anteriorly the glottic triangle is scarcely open. If paralysis is incomplete, the vocal cords are in contact almost up to their posterior part, leaving, however, between them at this level a noticeable space. The larynx is then less shrivelled, the epiglottis is less depressed, and it is generally easier to see the posterior glottic triangle, with an apex, which is the more anterior as the paresis is the less complete. The slight phonetic disturbances observed by Elsberg refer to such cases.

*Diagnosis.*—This paralysis is sometimes difficult to recognize. Indeed, the larynx is so folded on itself during phona-



tion, that the mucosa appears red, turgescient, and swollen. Consequently, a complete paralysis of the ary-arytænoideus is liable to be confused with an œdematous inflammatory laryngitis. To establish the true nature of this disease, request the patient to breathe several times, to see whether the swelling disappears during normal respiration, whether

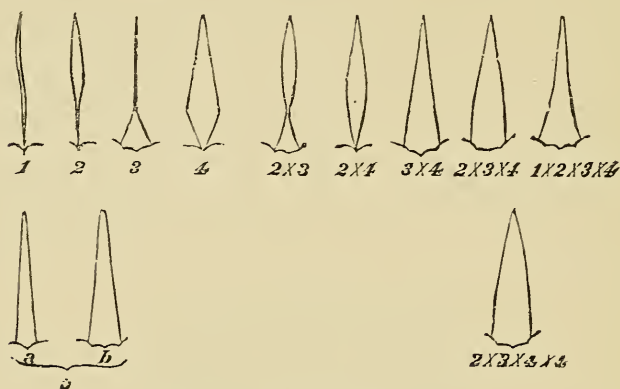


FIG. 149.—DIAGRAM OF PARALYSIS OF THE MUSCLES OF THE LARYNX.  
(AFTER ELSBERG.)

The first row comprises paralysis indicated by phonatory 'leakage'; the second to the left = 5 (*a* and *b*), paralysis of the dilators, recent and old; the figure on the right ( $2 \times 3 \times 4 \times 5$ ), paralysis of the constrictor muscles. The cords remain immobile during phonation and inspiration.

*Isolated Paralysis.*—1, Paralysis of the crico-thyroidæus tensors (the cords are sinuous); 2, paralysis of the thyro-arytænoidei; 3, paralysis of the ary-arytænoideus; 4, paralysis of the lateral crico-arytænoidei.

*Combined Paralysis.*— $2 \times 3$ , Paralysis of the thyro-arytænoidei and of the ary-arytænoideus;  $2 \times 4$ , paralysis of the thyro-arytænoidei and of the lateral crico-arytænoidei;  $3 \times 4$ , paralysis of the lateral crico-arytænoidei and of the ary-arytænoideus;  $2 \times 3 \times 4$ , paralysis of the lateral crico-arytænoidei, the thyro-arytænoidei, and the ary-arytænoideus;  $1 \times 2 \times 3 \times 4$ , paralysis of all the constrictors; 5 (*a* and *b*), paralysis of the dilators;  $2 \times 3 \times 4 \times 5$ , paralysis of all the muscles of the larynx.

the arytenoids move to and fro physiologically, or, on the contrary, remain immobile during phonation or quiet respiration.

Interarytenoid tumours, or infiltrations preventing the adduction of the arytenoids, are easily perceptible on direct examination, their existence precluding the diagnosis of simple paralysis.

Double ankylosis is accompanied by evident symptoms, on which it is needless to dwell.

*Course and Duration* depend absolutely on the nature of the affection and on its cause. If the malady is of a catarrhal, inflammatory origin, it is usually of short duration. If it is due to hysteria, the motility reappears as rapidly as it vanished.

*Prognosis* also depends on the etiology of the muscular disturbance.

### *Treatment of the Laryngeal Paralysis.*

Treatment should be directed to the cause of the paralysis. Should the muscular disturbance be connected with a general affection (hysteria, rheumatism), the latter should be combated by suitable means. When, on the contrary, it is consequent on compression, the cause should be removed if possible. This is the only means of curing the disease, but in many cases, however, it cannot be effected.

Local treatment in inflammatory cases consists of rest, sprays, painting the cords with solutions of zinc chloride, nitrate of silver, etc. If such treatment fails, resort should be had to external massage with the hand or electric motor, or to the use of the faradic or continuous current. Electricity can be used from the first externally, the two poles being placed on the paralyzed muscles. If the constrictors are paralyzed, one of the poles should be placed on the nape of the neck, the other in front of the larynx, or successively on the sides of the neck at points corresponding to the arytenoids. The electrode may also be applied on each side of the larynx towards the arytenoid region. During treatment the patient should be asked to use his voice, and pronounce as loud and as slowly as possible the vowels, and sometimes even long full sounds, and run over the gamut, making at each sound a protracted and profound inspiration.

In hysterical paralysis it is not uncommon to observe on the sides of the larynx vibrating areas, the compression of which is sufficient to restore the vocal integrity. In some cases, by raising the head and drawing the cricoid to the

thyroid, the normal timbre of the voice is obtained, whereas in other patients the very opposite has to be done—the approximation of the thyroid to the cricoid.

It is difficult to mention all the modes of treatment applicable to those paralyses, as the most unlikely means often succeed where rational treatment fails.

In some cases the different external methods referred to do not succeed, in spite of frequent painstaking application. Recourse must then be had to endolaryngeal electrical treatment, by placing a pole at the level of the pomum Adami, while the other is directed to the cords themselves, or by using a double electrode placed posteriorly on the larynx or even on the vocal cords.

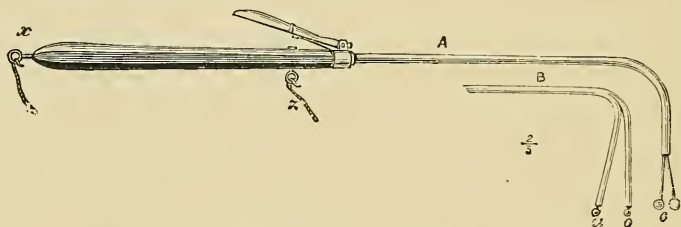


FIG. 150.—DOUBLE INTRA-LARYNGEAL ELECTRODE.

A, Conducting-rod ; B, the inner part ; X, the connecting-points.

The intensity of the current must be proportional to the degree of paralysis and the resistance and endurance of the patient. Once contact is established the voice is restored. This treatment is ineffectual in grave paralysis of myopathic origin, or in that due to central disturbances or to compressions of long duration. It is very successful in neuro-pathic forms. In many cases the resultant disturbances, and not the paralysis, should be kept in view. When the two dilators are affected, respiration is so compromised that tracheotomy must be carried out.

In doubtful forms, where the cause of the loss of movement is not readily determined, a mixed treatment (biniodide) or painting with iodine over the tract of the recurrensts should be prescribed, and salicylate of soda administered in suspected cases of rheumatism.

## SPASM OF THE LARYNGEAL MUSCLES.

Under this name is designated a transitory or permanent contraction of one or of all the muscles of the larynx. These spasms may be classified as follows: (1) Functional spasm; (2) due to direct irritation; (3) of peripheral origin; (4) of central origin; (5) reflex; (6) spasm associated with a general affection.

**Functional Spasm, or Spasm of the Muscles of Phonation**, comprises professional cramp of the muscles concerned in phonation. This affection is known under different names—*e.g.*, contraction of the phonatory muscles (Elsberg); phonic spasm (Koch); mogiphonia, or voice fatigue (B. Fraenkel, Bresgen); dysphonia spastica (Schech).

*Etiology*.—This neurosis is generally the result of exaggerated vocal fatigue. The phonic spasm may be compared with writer's, musician's, or phonographer's cramp. Hysteria must also be taken into account. At other times the explanation of the disturbance must be sought for in the nasal fossæ. Thus, this neuro-muscular reflex may be a result of polypoid degeneration, hypertrophy, or various tumours of the Schneiderian membrane (Bresgen). Acute pharyngitis or laryngitis often gives rise to this affection. Goitre has also been suspected as a cause, but probably it may have been a question of true irritation of the recurrensts. Finally, phonic spasm may be of central origin.

*Symptoms*.—The chief functional symptom is alteration of the voice, which results from the sudden exaggerated contraction of the muscles of phonation. When the patient wishes to emit a sound—speak, read aloud, or sing—the sound is choked, frequently only half pronounced, or even not at all. There occurs, as Koch aptly remarks, a true stammering of the vocal cords.

Aphonia is usually complete. The patient *gives one the impression of making exaggerated efforts* to contract his vocal cords, without being able to utter a sound. The alterations of the voice vary, according as the spasm is transitory or

permanent. It generally affects the phonatory muscles, and consequently vocal disturbances are the chief symptoms.

Coughing, laughing, and whispering are effected normally, except in grave cases. Respiration is, as a rule, intact.

On laryngoscopic examination during rest, the laryngeal mucosa seems to be healthy. It is only during phonation that the vocal cords are seen to contract and adduct briskly and energetically, and even encroach on one another. When the spasm is localized to the posterior ary-arytænoidei or to the thyro-arytænoidei, there occur series of transitory images, very variable in their form. Sometimes the two arytenoids are seen to rub energetically against each other, causing the abrupt adduction of the cords posteriorly. At other times the lips of the glottis come in contact antero-posteriorly, while posteriorly they remain open. This spasmodic contraction, which prevents the formation of the glottic 'reed,' and explains the special and characteristic aphonia of those cases, is easy to observe.

*Course, Duration, Termination.*—The course depends on the cause of the disease. The spasm, generally mild at its outset, may increase, if the patient does not take precautions to arrest it. In nervous subjects a violent emotion is very often sufficient momentarily to intensify the muscular disturbance. The duration is therefore extremely variable. Transitory in some cases, it sometimes becomes obstinate, and may last for months, even years. Cure, as a rule, takes place.

*Prognosis* is grave, especially in professionals, because, if it is always possible to effect a cure by appropriate treatment, relapses are liable to occur. When those disturbances are of a neuropathic or nasal origin, the prognosis is more favourable. If they are the result of vocal fatigue, they usually disappear after a more or less protracted rest.

*Diagnosis* is easy, because the modifications of the voice and the results furnished by examination of the larynx are so characteristic, that spasmodic aphonia cannot be confused with any other lesion.

*Treatment.*—The cause of the disease, if known, should be



attended to. Generally speaking, rest is the first consideration. Methodical exercise of the voice, preceded by regular and rhythmic respiratory practice, singing, massage of the larynx, or electricity (preferably the continuous current), should be recommended.

Hydrotherapy, painting of the laryngeal mucosa with a solution of cocaine (1 in 10) may also be tried, while, according to the cases, bromide of potash, valerianate of ammonia, or merely tonics, should be internally administered.

If the lesion is of nasal origin, the nasal mucosa should be attended to. With a little patience, a definite cure will gradually be obtained.

**EUNUCHOID VOICE.**—Occasionally in certain male adults at puberty, the voice, instead of changing its timbre and becoming deeper, retains an acute infantile tone. Sometimes the youth seems to be affected with catarrhal laryngitis and consequent muscular disturbances. Thus, during the pronunciation of a sentence he at one time emits a deep and raucous sound and at another a falsetto note. There exists, as it were, a vocal disorganization, through asynergia of the muscles controlling the movements of the cords during phonation. This eunuchoid voice is usually produced through functional irregularity of the laryngeal muscles, the subject affected being able to use only a limited part of the vocal 'reed.' It is equally observed in youths of seventeen or eighteen years of age, whose voices have broken rapidly, and whose vocal cords, being suddenly lengthened, have not had time to get accustomed to the new condition.

Ruault thinks, that the eunuchoid voice is sometimes the result of arrest in the development of the larynx at the time of puberty, but the author's experience does not accord with that theory. Besides, all cases observed by him have been cured in a few days by regular and rational treatment.

*Treatment* consists in vocal gymnastics. The patient should be taught to breathe profoundly, and then to lower the head, with the chin downwards, so as to relax the vocal cords. Once in this position he should emit a deep chest sound. If need be, the emission of this sound could

be facilitated by approximating the cricoid cartilage to the thyroid. As soon as the deep sound is obtained, the patient should pronounce a syllable in the same tone, then some words slowly articulated, and afterwards a whole sentence. The voice soon changes its timbre and becomes deep, because large larynges (baritones and basses) are chiefly exposed to this disease.

**Spasms through Direct Irritation.**—These are observed in the course of acute inflammation of the mucosa in predisposed nervous subjects. Thus, they are frequent in children affected with acute laryngeal catarrh. They may even become so intense in those cases, that they merit a special description.

**STRIDULOUS LARYNGITIS.**—The acute, abrupt œdema of the vocal mucosa, acting like a foreign body, may give rise to spasms. Voluminous pedunculated tumours are liable to titillate the vocal mucosa, and occasion spasm of the cords. The laryngeal mucosa soon becomes accustomed to the friction, which no longer causes reflex phenomena. When the neoplasm is bulky enough to interfere with the entrance of the air into the tract, the spasm, no matter how light, only increases the respiratory stenosis. Foreign bodies, at the moment of their introduction into the respiratory canal, violently excite the laryngeal sphincter, and cause a more or less acute spasm, according to the nature of the body.

Liquids may cause choking (*engouement*—i.e., a spasmodic cough, which generally abates in a few moments). This phenomenon specially occurs, when the liquids penetrate into the posterior inter-arytenoid region. Inhalation of irritating dust or vapour—sulphuric acid, ipecacuanha powder, etc., occasions also a true momentary choking. Certain topical applications voluntarily introduced into the larynx may also cause spasm—e.g., concentrated solutions of chromic acid, nitrate of mercury, nitrate of silver, lactic acid, etc. Those spasmodic onsets are most frequent in patients with obstructed nasal fossæ, whose vocal mucosa is being treated for the first time. They may sometimes become so violent, as to frighten an inexperienced practitioner. This transitory contraction of the laryngeal

muscles may be observed in nervous subjects, on painting the pharynx, or on forcibly depressing the tongue during inspiration.

*Symptoms.*—The spasm due to direct irritation characteristically occurs at the exact moment when one of the above causes is present. Consequently its onset is abrupt. It is sometimes ushered in by a tickling sensation, causing fits of coughing, which consists of a series of rapid expirations, followed by a sonorous whistling characteristic inspiration. Expiration is short and inadequate, the patient with great difficulty endeavouring to inspire again. If this condition persists, the face becomes congested; asphyxia, and even death, may ensue.

*Course, Duration, Termination.*—The spasm recurs whenever the exciting cause is present, but probably with less intensity. Endolaryngeal manipulation may at first cause a violent contraction, but only a slight feeling of constriction the second or third time.

The duration of the glottic spasm is generally short, if it is violent; but, if the air still penetrates the air tract, whistling respiration may be protracted for several minutes, even for more than an hour.

In the case of a foreign body the crisis occurs at each displacement. This is a characteristic sign, on which the author dwells later on. If apnœa is complete, asphyxia may result. The spasm generally stops at this stage, and the patient is then able to breathe normally, unless he succumbs to heart failure. This fatal termination is observed specially in people affected with cardiac disease or aneurismal dilatation, in whom spasm causes rupture.

*Prognosis* is based on the foregoing discussion, and is benign in most cases.

*Diagnosis* is easy. The history, with examination of the larynx, generally permits the cause of the lesion to be recognized, and consequently suggests the appropriate remedy.

*Treatment.*—The initial treatment should be prophylactic, and consist in keeping the patient away from the causes capable of producing spasmodic laryngitis. Thus, the in-

flammatory or œdematous onsets should be attended to. Tumours or foreign bodies, if they exist, must be removed. Should the spasm be the result of direct applications or irritating inhalations, the laryngeal mucosa should be gradually accustomed to them.

These contractions are less frequent and intense if the vocal mucosa has been anæsthetized with a solution of hydrochloride of cocaine (1 : 15 or 1 : 10). In every case, before painting the larynx for the first time, the practitioner should assure himself that nasal respiration is normal. If it is not, the nasal mucosa should unhesitatingly be painted with a solution of adrenalin (5 : 1,000), or even with an adrenalized and slightly cocainized solution. Under the influence of this application, the Schneiderian membrane undergoes a considerable retraction, which renders nasal respiration freer. By this method spasm is prevented, or at least decreased.

Treatment of the onset itself should consist in *preventing the patient struggling to get air and widely opening his mouth. He should be asked to retain his breath for a moment or two, and resume breathing gently through the nose.*

If the spasm is due to the forced depression of the tongue, care must be taken to depress only the anterior third of this organ gently and slowly, in order to give confidence to the patient, who should be asked to make an expiration while emitting the sound 'ah.' As far as possible the tongue-depressor should not be introduced during inspiration, and, above all, the base of the tongue should not be thrust back on the laryngeal orifice, as the epiglottis, being kept down, might produce the crisis.

**Spasms of Peripheral Origin.**—Those spasms result from the irritation of the pneumogastrics, or of their recurrent branches. This is, as it were, the first stage of recurrent paralysis, and is therefore due to the same causes—hypertrophy of the lateral lobes of the thyroid body, malignant neoplasms of the trachea or of the superior third of the air tract, aneurismal tumours of the aorta (left recurrent), or of the subclavian (right recurrent), indurations

of the apex of the right lung, certain abscesses of the neck, wounds in that region, and, finally and specially, transitory or chronic hypertrophy of the peritracheal glands. This adenopathy is one of the most frequent causes of irritation of the laryngeal or pneumogastric nerves in children, as well as in adults.

The spasmodic disturbance occurs when there is irritation of the nerve filaments, without abolition of their function. In the latter case unilateral or double paralysis would occur.

*Symptoms.*—At the outset, when the excitation is slight, the patient complains of a mere tickling sensation in the pharyngeal cavity, which produces coughing.

The cough is dry and spasmodic in nature. Later, it becomes more like whooping-cough, is permanent, and often even paralysis of one of the vocal cords is the consequence of an aggravation occurring on the course of the nerve.

An important feature of those spasms is that they appear, diminish, and even cease in certain positions of the head or neck. This is noticed, specially in tumours of this region, even in cases of adenopathy.

Laryngoscopic examination is usually negative. Slight redness is observed on the posterior portion of the cords and on the interarytenoid region, when coughing is obstinate or spasm frequent.

*Course, Duration, Termination.*—The course of this neurosis varies with its cause. If it is of neoplastic origin, the spasmodic cough at the outset is usually replaced by the loss of movement of the vocal cord, or cords corresponding to the compressed recurrent. In cases of adenopathy, goitre, or pulmonary consolidation, the nervous irritation varies according to the treatment, or spontaneously.

*Prognosis* depends on the cause of the muscular disturbance. The latter is, however, seldom intense enough to endanger life or necessitate surgical intervention.

*Diagnosis* should chiefly consist in determining the primary cause of the nerve irritation. This is not always easy to accomplish, as the methodical examination of the organs



lying along the course of the pneumogastric or the recurrent often may not allow of the nature of the irritation being recognized. Radioscopy or radiography is helpful.

*Treatment.*—Once the cause of the lesion is recognized, it should first of all be attended to. In doubtful cases iodide of potassium or of sodium should be prescribed in variable doses, according to the tolerance of the patient. Counter-irritants (tincture of iodine, blisters, methyl chloride, ignipuncture, etc.) may be applied to the course of the nerve. If they fail, morphia, chloral (alone or associated with bromide of potassium), will relieve the patient for some time.

Sprays of hydrochloride of cocaine, along with bromide or antipyrin, are also excellent applications. Salicylate of soda in some rheumatic people gives good results. Finally, as the disease progresses, irritation of the nerve is replaced by the abolition of its function, with atrophy.

**Spasms of Central Origin.**—Those spasms are now better known. According to some authors (Krause), spasm of the laryngeal muscles is observed in certain affections of the nervous centres. It may be consequent on spinal syphilis, cerebral tumours or hæmorrhages, saturnine paralysis, epilepsy, pseudo-bulbar paralysis, progressive general paralysis, sclerosis *en plaque*, railway-spine, and tabes. In most of those cases there exist either disturbances of sensation or paralysis of the laryngeal muscles, sometimes even permanent contraction, but true spasmodic crises are observed only in locomotor ataxy.

*Symptoms.*—The author does not intend to describe here the symptoms of tabes in general, but only the spasmodic disturbances observed either in the course of or premonitory to this affection. We may divide them into three groups, according to their intensity: (1) onsets of simple spasmodic cough; (2) onsets of choking with loss of consciousness; (3) apoplectic form, with asphyxia.

1. *Onsets of Spasmodic Cough.*—This is the slight form of the attack. The patient experiences in the pharyngeal cavity a titillating or a smarting pain that causes fits of convulsive

coughing of short duration, with whistling respiration. In a few seconds the face becomes cyanosed, the patient restless and agitated, and suddenly the crisis stops, to recur three or four times daily. In a case recorded by Munschina this crisis was accompanied by eructations and cardiac disturbances (asystole).

2. *Choking Spasms*.—At this stage the spasm is sufficiently violent to occasion complete loss of consciousness, with or without epileptiform movements. The initial symptom is a sensation of burning in the throat or of constriction, then follow a sudden contraction and adduction of the cords; respiration becomes stridulous; the patient becomes pale, even blue and cyanosed (Krishaber). His face is flushed and swollen. Then he loses consciousness, but yet has time to fall gently. This state lasts for several minutes, and is accompanied by convulsive movements of the limbs. The pulse is rapid. Then the spasm suddenly ceases, respiration is restored, and the patient becomes conscious again, till a new crisis occurs, which may appear on the least cause.

3. *Apoplectic Spasms*.—In those cases the patient, seized all of a sudden by a true sensation of strangulation, collapses with all the phenomena of cerebral congestion. The face becomes cyanosed and puffed, the eyes project, apnœa is almost complete. The pulse, although regular, is weakened and accelerated. Epileptiform convulsions accompany this violent crisis, which may be fatal, unless surgical intervention is rapidly afforded.

Usually the spasm ceases as suddenly as it appeared. The characteristic of these affections is its sudden appearance, often without any apparent immediate cause. In those patients a diminution, or even complete abolition, of sensibility in the pharyngeal cavity is frequently observed. Laryngoscopic examination made between attacks furnishes, as a rule, negative results; but in some patients paralysis or transitory contracture of one vocal cord has been observed.

*Course—Duration*.—Laryngeal manifestations may appear at the premonitory period of the tabes (pre-ataxic period), or

when the affection is clearly confirmed. Those prodromic phenomena sometimes precede by several years the other symptoms of locomotor ataxia. In many cases the laryngeal crisis has been the means of the diagnosis of this disease.

The attacks are usually slight at the beginning, and may pass unperceived until the disease has reached an advanced stage. The course of the affection is not always progressive, for the patient may pass abruptly from the first to the third stage, just as the onset may occur several times in the twenty-four hours, or leave the patient undisturbed for several days or even months, and appear afterwards on the slightest cause.

*Prognosis.*—Laryngeal crises of themselves constitute a serious complication of tabes, in so far as they are an aggravation of the general affection.

*Pathological Anatomy.*—On autopsy, there are generally found bulbar lesions or alterations of the roots of the pneumogastrics, of the spinal accessories or the nerve trunks, which are reduced to slender filaments. Laryngeal crises have been attributed by several authors (Gieson) to neuritis of the nerve trunks, rather than to the central lesions seen on autopsy.

Pathological modifications of the laryngeal membrane are more the result than the cause of spasm.

*Diagnosis.*—When spasm occurs at the pre-ataxic period, diagnosis may be difficult, especially if the crisis is slight. Manifest analogies are then presented, either with spasms due to peripheral irritation, or with reflex spasms. Diagnosis can be established by a careful examination of the patient, eliminating all causes of compression of nerve filaments and by examination of the various organs capable of producing a reflex spasm, more especially the nasal fossæ, and sometimes by seeking for the different signs of tabes or other nerve lesion.

If laryngoscopic examination reveals the existence of a paretic or paralytic vocal affection without any appreciable cause of compression, a central lesion should be looked for. When the apoplectic form, with loss of consciousness, occurs, it is almost certain to be connected with locomotor ataxia.

*Treatment.*—As the laryngeal crisis depends on central disease, the latter should first of all be attended to. If the crisis endangers life, tracheotomy should be performed. During the onset of suffocation artificial respiration, inhalations of ether or of chloroform, or intubation of the larynx, will prevent asphyxia.

### Reflex Spasms.

These include certain spasmodic disturbances of the laryngeal muscles, consequent on lesions of more or less distant organs.

*Etiology.*—Those contractions are commonly met with in connection with irritation or lesions connected with the ear, stomach, uterus, and particularly the nasal fossæ.

The genital or uterine cough (dry and spasmodic) is observed after sexual intercourse, normal or excessive, after or during menstruation, and without any lesion being found in the uterus. The ligature of the pedicle in hysterectomy sometimes causes violent onsets of laryngeal spasm. The various affections of the cervix uteri, or of the uterus itself, and especially any abnormal position of the latter (anteversion, retroversion, etc.), may also produce laryngeal spasm. It usually occurs under the influence of mental excitation in predisposed subjects, more particularly in women. Fits of spasmodic coughing, and even of suffocation, sometimes take place on the introduction of an aural speculum, or on probing the auditory meatus. A similar effect may be produced by the following lesions: hypertrophy, with or without septal deviation, or with spur formation pressing on the swollen mucosa; lesions in the naso-pharyngeal cavity; polypoid degeneration; true polypi; or other irritation. Some authors think, that disturbances of the stomach, intestines (Secchi), uterus, or genital organs, produce reflex cough or spasm through the Schneiderian mucous membrane.

These phenomena appear in nervous or hysterical subjects. The immediate causes of the spasm are extremely variable.

*Symptoms.*—This spasm in slight forms consists simply in a fit of dry whooping-like cough, analogous to that observed

in spasm of central origin, without, however, producing suffocation. At other times a violent contraction of the vocal cords takes place, impeding the passage of the air through the constricted glottic orifice; cyanosis occurs, even asphyxia, followed in some cases by loss of consciousness.

The crisis usually begins with a fit of violent spasmodic coughing, accompanied by respiratory inconvenience; whereas at other times the glottic constriction is abrupt, rapid, and grave enough to necessitate the opening of the air tract.

Onsets occur during the day or night, and often without apparent cause. It is probable, that during sleep the nasal congestion becomes more and more pronounced, according to the position of the patient, and gives rise to the crisis. In patients affected with deviation of the septum, with a posterior spur, the lateral decubitus determines the swelling of the pituitary membrane; the latter, then, coming in contact with the projecting part of the septum, produces the reflex.

The contraction is sometimes confined to the phonatory muscles, thus causing true phonic spasm (Heryng, Brébion).

On examination, the larynx appears quite normal. After the crisis a more or less pronounced hyperæmia of the vocal mucosa may be observed, but it is rather a consequence than the cause of the attack.

*Course, Duration, Termination.*—Reflex spasms take place under the influence of a direct or an indirect excitation of the irritable area.

The onsets occur either daily or at more or less distant intervals. The course and duration are very irregular. When diagnosis has been made and rational treatment applied, a cure generally results.

*Prognosis* depends on the cause, the intensity of the crisis, and the rapidity of the diagnosis. Tracheotomy may be necessary, but only in exceptional cases, as asphyxia causes the contraction to cease, and permits the patient to breathe.

*Diagnosis.*—It is important to ascertain the origin of the laryngeal disturbances. Accordingly, it is necessary carefully to examine the various organs liable to occasion the crisis, more particularly the nasal fossæ. If rhinoscopy proves



negative, the naso-pharyngeal cavity should be inspected. To confirm in doubtful cases the diagnosis, a cocainized solution, with or without adrenalin, should be applied to the nasal mucosa. If the spasmodic crisis diminishes in intensity and frequency, there is ground for suspecting, that the pituitary membrane is the source of the disease.

*Treatment.*—Once diagnosis is made, (1) the attack should be treated, and (2) its reappearance prevented.

In the former case the nasal fossæ should be first sprayed with a solution of hydrochloride of cocaine (adrenalized). The patient should be requested to breathe through the nose gently, the mouth being closed. The following solution may be employed as a spray, or for painting the pituitary mucosa:

R Hydrochloride of adrenalin

(1 : 1,000)	...	...	5 drops	℥v
Hydrochloride of cocaine			30 centigrammes	gr. 5
Sterilized water ...		15 to 20 grammes		ʒiv to v

Inhalations of warm water, to which a few drops of chloroform are added, afford good results (Sir Morell Mackenzie).

In grave cases sinapisms may be applied to the chest or to the calves. The face should be sprinkled with cold water, or, if need be, whipped with a soaked towel. If asphyxia threatens, artificial respiration, even tracheotomy or intubation of the larynx, should be performed.

In the second case attention should be paid to the cause of the spasm. The hypertrophied nasal mucosa should be treated, the spurs removed, etc.

A general antispasmodic treatment (valerianates, bromides, physical exercise, douches, or lukewarm baths) should be prescribed.

## Spasms Associated with a General Neurosis :

### NERVOUS COUGH—LARYNGEAL CHOREA.

Under this designation are comprised spasmodic phenomena observed during the course of a general neurosis.

This condition has been specially studied by Massei in

1878, and in the following year by Schrötter under the name of chorea of the larynx.

Nervous cough should, however, be distinguished from the rarer condition of laryngeal chorea.

(A) NERVOUS COUGH.—By this we mean a cough which is noisy and of a more or less metallic character, occurring apart from lesions of the larynx, lungs, or laryngeal nerves.

(B) CHOREA OF THE LARYNX.—This condition is associated with convulsions of the muscles of the face or of the limbs, resembling chorea.

*Etiology.*—Those diseases are generally due to hysteria or to an exaggerated nervous irritability. They occur in women affected with vaginal disturbances, or in cases of profound chlorosis or anæmia. Fear or excitement are additional causes. This affection is specially observed in girls from sixteen to twenty years of age.

*Symptoms.*—Choreic cough is characterized by its being very abrupt, sudden, and noisy, and occurs (Gottstein) either paroxysmally or in a rhythmic continuous form.

The cough and choreic movements may alternate.

Nervous cough is dry and rapid; that of chorea is less frequent, and the fits cease during sleep. Finally, choreic disturbances only occur during a physiological action—viz., singing. Laryngoscopic examination is negative, apart from an occasional redness of the mucosa or tremor of the cords. During the crisis the arytenoids are observed to adduct abruptly, and the cords assume the phonatory position.

*Diagnosis.*—The important point of the diagnosis is to eliminate lesions capable of irritating or compressing the pneumogastric or recurrent laryngeal nerves. Examination of the nasal fossæ sometimes shows, that the phenomena observed are due to a reflex origin.

*Course, Duration, Termination.*—In hysterical patients laryngeal spasm may disappear for years without leaving the least trace. It often alternates with spasmodic disturbances of other regions. When due to the lesion of another organ, it generally vanishes, when the latter has been cured. Vocal chorea may persist for years.

*Prognosis* is, on the whole, good, except in some cases, where the patients cannot enjoy sleep or rest.

*Treatment* consists in the administration of tonics. In chronic nervous cough antispasmodics may be used beneficially. Sometimes quinine, arsenic, and other tonics are to be preferred. Douches and protracted lukewarm baths will counteract the nervous condition of the patient. Travel and amusement are of benefit. Locally, cocainized sprays, or even brushing the mucosa of the larynx or the pharyngeal cavity with anæsthetizing solutions, and electrical treatment with massage, should be prescribed. Methodical vocal exercise is also of advantage.

### Laryngeal Vertigo.

*Etiology.*—This affection is characterized by giddiness, accompanied by loss of consciousness, and occurs in lesions of the respiratory organs, especially spasmodic bronchitis, polypi of the larynx, tabes, or even independently.

It is probably due to the influence of cold, sudden changes of temperature, emotions, irritating vapours, alcoholic beverages, but mainly to a neurotic temperament.

*Symptoms—Pathogeny.*—The onset is usually preceded by titillation, a sensation of burning, or even by a feeling of a foreign body in the larynx.

Shortly afterwards fits of whooping-like cough take place, followed by loss of consciousness. The vertigo is occasionally slight, and resembles the sensation due to a blow on the head. At other times it appears as a spasmodic cough, with dyspnœa, and a vague sensation of giddiness, without loss of consciousness.

The cause of those disturbances is obscure. We may assume with Weill, that the larynx is the origin of a series of irritations, which may extend to the central nervous system, and suspend the cerebro-spinal activity, or, on the contrary, reinforce it.

*Course—Duration.*—The course of laryngeal vertigo is exceedingly variable, and depends on the cause of the lesion. It may alternate with the crisis of asthma, and

then occur at more or less distant intervals. In other cases the crises are frequent, appearing several times daily, and are of short duration. The patient has an attack of giddiness or of a temporary loss of consciousness, which compels him to stop and support himself. He seldom falls.

*Diagnosis.*—It is extremely difficult to differentiate laryngeal vertigo from reflex spasm. Diagnosis is founded on the presence or absence of nasal lesions.

*Treatment.*—The general nervous condition of the patient should be treated with antispasmodics. Sedative sprays should afterwards be applied to the laryngeal mucosa, or the parts brushed with the following :

R Hydrochloride of cocaine	60 cgms. to 1 gramme	gr. 9 to 15
Antipyrin and bromide		
of potassium	... āā 4 grammes	āā gr. 60
Glycerine	... 40	„ 3ix
Tincture of eucalyptus	... 10	„ ʒclx
Water	... 450	„ 3xvi

This should be employed once or twice daily for three to five minutes with a steam spray.

Should congestion of the vocal mucosa appear to be the cause of the attack, the following spray may be prescribed :

R Hydrochloride of cocaine	60 cgms. to 1 gramme	gr. 9 to 15
Hydrochloride of adrenalin		
(1 : 1,000)	... 3 to 5 grammes	ʒxlx to lxxv
Bromide of potassium	... 5	„ gr. 75
Glycerine	} āā 50	} 3xi
Peppermint water		
Water	... 400	„ 3xiv

In pronounced vocal irritation, chlorate of zinc or nitrate of silver (1 : 60 or 1 : 50 to 1 : 30) produces excellent results, when inflammatory forms of the laryngeal mucosa exist.

## Tumours of the Larynx.

Laryngeal tumours may be classified into two groups: (1) those constituting an affection essentially localized in the mucous membrane, or (2) those appearing as infiltrated neoplasms tending to invade the neighbouring parts. Those are respectively the benign or the malignant tumours, the former being described as polypi of the larynx.

### BENIGN TUMOURS (POLYPI OF THE LARYNX).

*Etiology.*—The causes of benign neoplasms of the vocal mucosa are most complicated. Laryngeal polypi result from acute or subacute inflammation of the vocal cords (Sir Morell Mackenzie), though sometimes the reverse holds good. It is often impossible to say whether the chronic catarrh accompanying these benign tumours is primary or secondary, though the latter is the more probable.

Some authors have thought that the nodal points of the vocal cords were most predisposed to fibroma (Klebs and Schnitzler). Certain professions (singing, teaching, speaking, etc.) predispose to laryngeal polypi, which generally occur about adolescent and adult age (twenty to fifty). Since laryngoscopy has become more general, *benign* neoplasms of the larynx are more frequently observed than formerly.

Laryngeal polypi appear to be more common in men than in women (Schwartz). Local irritation plays a part in their production, heredity being of little account.

*Symptoms.*—Benign tumours of the larynx may give rise to different functional disturbances, varying according to the site and nature of the polypi (sessile or pedunculated, old or recent, small or bulky), and according to the rapidity or slowness of their growth.

*Voice.*—If the polypus is situate on one of the vocal cords, as is most frequently the case, the first disturbances are those of phonation.

Those vocal alterations sometimes pass unperceived.



Singers have at the commencement a difficulty in emitting shades of sound, the note is less pure, and the passing from the chest voice to a falsetto is less easy. Dysphonia, huskiness, and aphonia, are observed in some cases. The symptoms are more or less pronounced, depending on whether the polypus is situate at the level of the anterior third, on the free edge of the vocal cord, or above the latter.

As the tumour is sessile or pedunculated, the voice will be altered in a permanent or transitory manner. Indeed, when the polypus has a sufficiently long pedicle, it may place itself either above or below the glottic lips, and a relatively clear voice may now and then become normal.

On the contrary, it may happen during the emission of a word or phrase, that the voice suddenly becomes husky, or even aphonic, if the polypus changes its place. Some singers possess the phenomenon known as diphonia, or double voice.

It therefore seems, that polypi of comparatively small size, situate on the edge of the vocal cords or at their angle, may produce a relatively considerable vocal alteration, whereas a more voluminous pedunculated tumour, situate above or below the glottic lips, will hardly affect the voice.

When the polypi are situate at other points, the functional symptoms are irregular. If the interarytenoid region is affected, the voice becomes dull, husky, or even hoarse; but the voice may be intact, if the tumour is on the epiglottis or the aryepiglottic folds.

Vocal disturbances are generally more pronounced in children than in adults, the least pathological projection preventing the vibration of the cords.

Diffuse tumours (papillomata) produce aphonia.

*Respiration.*—Respiratory difficulty is usually absent. It depends on the site and dimension of the neoplasm. If the neoplasm is very large and grows slowly, it may acquire an excessive volume without causing too intense respiratory

disturbances. The glottic orifice is almost entirely obstructed by the tumour, before dyspnœa appears. The latter sometimes approaches suffocation, and threatens death from asphyxia. Wet weather increases the respiratory difficulties, owing to the hygroscopic nature of the polypi. Inflammation of the laryngeal or pituitary mucosa helps to intensify the dyspnœa. When the tumour is very pedunculated, the fits of suffocation or of asphyxia are paroxysmal. Generally speaking, it is in consequence of some muscular effort, or of the accumulation of secretions in the larynx, that dyspnœic disturbances are produced.

Certain positions of the head affect respiration (Fauvel, Poyet): thus, bending forwards facilitates breathing, while extending it backwards hinders the entrance of air.

In the case of children, owing to the narrowness of the glottic orifice, respiratory disturbances constitute an important symptom.

*Cough.*—Cough is rather rare, and may be associated with a concomitant affection (catarrhal laryngitis). Occasionally pedunculated polypi may lie across the glottis and produce a short ‘hem,’ but that is exceptional, for the laryngeal mucosa becomes accustomed to continual titillation, and this reflex disappears. The repeated friction may so dull tactile sensibility, as to facilitate surgical intervention by the natural tract.

When cough does exist, it follows the modifications of the voice, assuming successively its husky, raucous, croupoid (children), muffled tone.

*Dysphagia.*—Deglutition is only affected, when the tumour is extra-laryngeal, and occupies the epiglottis or the arytenoid region, and has acquired sufficient bulk, to obstruct the œsophageal entrance at the moment the bolus reaches it.

*Pain.*—Pain never exists in benign tumours of the larynx. If the polypus is bulky and situate outside the vocal organ, there is only a feeling of uneasiness or of a foreign body in the pharyngeal cavity.

Expectoration is usually absent. Sometimes fragments of neoplastic tissue (papillomata) are important in diagnosing

the disease, though they cannot indicate the site and size of the tumour.

*Objective Symptoms.*—The physical signs are always furnished by direct inspection of the organ. This should be made by strongly depressing the tongue (especially in the case of children) with Escat's or Kirstein's depressor, or recourse may preferably be made to the laryngoscope. To complete the diagnosis, palpation with the help of the probe should be employed, after the vocal mucosæ are anæsthetized with cocaine.

*Site.*—Benign tumours of the larynx have a noticeable predilection for the vocal cords. They are relatively rare in the ventricles, and quite exceptional elsewhere. Similarly, subglottic tumours are less common.

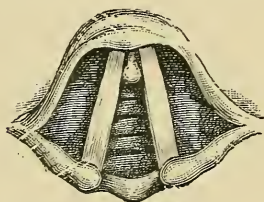


FIG. 151.—POLYPUS OF THE ANGLE OF THE VOCAL CORDS.

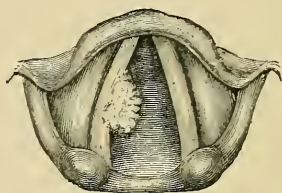


FIG. 152.—PAPILLOMA OF THE RIGHT VOCAL CORD.

Benign tumours may be divided into papillomata, cysts, fibromata, myxomata, adenomata, lipomata, angiomata, enchondromata, and mixed tumours.

The etiology and symptomatology of laryngeal polypi in general is applicable to those various morbid productions.

**Papillomata** are the tumours most frequently met with in the larynx.

*Site.*—Papillomata are situate on the vocal cords, usually on their anterior or middle third. They are sessile or pedunculated, generally defined and single, but several distinct tumours have been observed. Usually symmetrical, papillomata have a rosy-grey appearance, with a smooth glossy surface, and become reddish after coughing, when they have been exposed to repeated friction or unsuccessful operation.

They are of rounded form, and may reach a size from that of a millet-seed to a pea, and even larger. They are often muriform, composed of small granular projections of the size of a pinhead, and are then of a paler, rosy, almost yellowish hue, and their surface is, as it were, bristling with warty projections. These papillomata are usually diffuse, reach the volume of a horse-chestnut, and are comparable

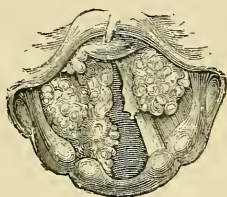


FIG. 153.—DIFFUSE PAPILLOMATA OF THE LARYNX.

to a large wart. They are formed of a central projecting portion, from which granulations are diffused, which give them the appearance of a small cauliflower. They are sometimes congenital, and are fairly frequent in children. These benign tumours occupy the cords, the ventricular bands, the ary-epiglottic ligaments, the arytenoids, the posterior surface of the epiglottis, and sometimes even the subglottic region.



FIG. 154.—PAPILLOMA OF THE RIGHT CORD IN A CHILD OF EIGHT YEARS. (AFTER MORELL MACKENZIE.)

The papillomata are of a flabby consistency, and swing to and fro with the respiratory movements. At other times they have a horny appearance, especially in certain old men. In these latter cases they may become malignant (epithelioma). Prognosis is not, however, always so grave, for the author has observed benign horny tumours in adults above forty-five years of age.

**Cysts.** — Voluminous intralaryngeal and extralaryngeal cysts may be always considered as rare. On the contrary, small cystic dilatations of the cords are relatively frequent, and have been often confused with papillomata, small angiomata, or adenomata.

Extralaryngeal cysts occupy the lingual surface or the

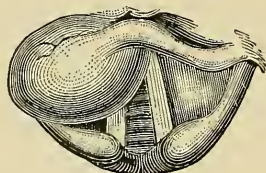


FIG. 155.—CYST ON THE FREE BORDER AND THE LINGUAL AND LARYNGEAL SURFACES OF THE EPIGLOTTIS (RIGHT SIDE).

edges of the epiglottis. They are the most voluminous, and may attain the size of an almond. They are smooth and even on their surface, and resemble a transparent hemisphere. The cyst wall is of a pale yellow and slightly rosy hue. A delicate vascular arborescence is observed on the surface of the cyst, which is much distended.

These tumours occur on the arytenoid region, the ventri-

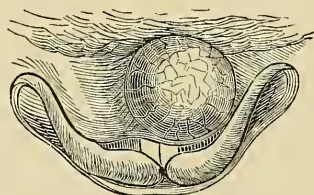


FIG. 156.—CYST ON THE LINGUAL SURFACE OF THE EPIGLOTTIS.

cular bands, or on the ventricles, their contents being generally serous or colloid, bloody or caseous (Blanc). In the latter case they may be confused with dermoid cysts. When they are seized with forceps a little blood escapes, with evacuation of the contents.

Intralaryngeal cysts are the most frequent, and vary in size from a pinhead to a walnut, their volume being on the



whole small. They are often situate on the edge of the vocal cords, are sessile, and are of a greyish or yellowish

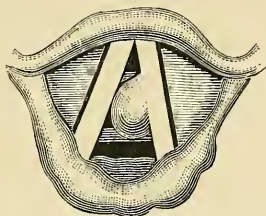


FIG. 157.—CYST OF THE FREE BORDER OF THE RIGHT VOCAL CORD.

appearance, and under a good light may even sometimes resemble a small transparent vesicle.

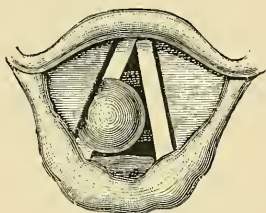


FIG. 158.—CYST PROJECTING FROM THE VENTRICLE OF MORGAGNI (RIGHT SIDE).

Those tumours contain a caseous substance, thick and concrete. They are attached to the vocal cord by a broad base,

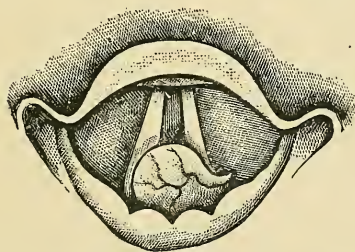


FIG. 159.—CYST OF THE LEFT VENTRICULAR BAND.

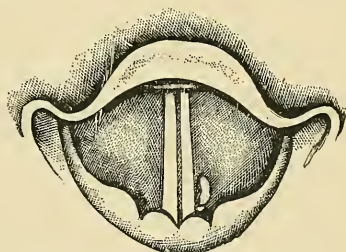


FIG. 160.—THE SAME LARYNX AFTER OPERATION.

which gradually blends with the healthy parts. They are hard to the touch and avoid the grasp of the forceps, which renders

their extraction as difficult as some very sessile fibromata.

In the histological examination of a case the cyst was lined by thick stratified paved epithelium (Nadal), the desquamated cavity being filled by the epithelial cells.

When the cyst is voluminous, it resembles a very tense envelope filled with liquid. It becomes rosy or even red after attempts at extraction or repeated palpation, owing to interstitial hæmorrhage. The structure of the limiting membrane is in nowise different from other cystic tumours.

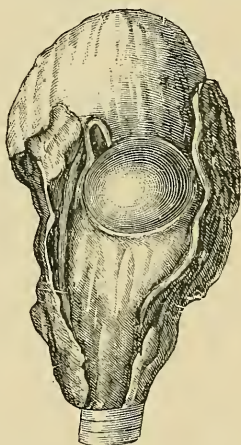


FIG. 161.—CONGENITAL INTRALARYNGEAL CYST IN A CHILD. (EDIS.)

Laryngeal cysts should be considered as retention tumours, developed within the glands. The cavity in these cases is formed at the expense of the glandular cul-de-sac by dilatation of the excretory canal, whose orifice is obstructed by external pressure, or by swelling of the walls, or by a plug of desiccated mucus.

**Fibromata.**—The usual site of those neoplasms is the vocal cord, and seldom elsewhere. Sometimes interstitial fibromata occupy the interarytenoid region. These neoplasms are usually single and almost never pedunculated. The size (Massei) varies from that of a mustard-seed to a haricot-bean. They are formed from the submucous tissue, and

consist of connective tissue intermingled with elastic fibres.

The fibromata are regular, unilobular, generally hemispherical, or slightly elongated and circumscribed. They may present two lobes, specially when degeneration occurs. Cases of fibromata with long peduncles have been noted.



FIG. 162.—FIBROMATA OF THE LARYNX. (MORELL MACKENZIE.)

*a*, Tumour, probably fibro-myxomatous; *b*, fibroma of the base of the epiglottis.

Their colour is greyish and resembles that of the cords in slight catarrh. They firmly adhere to the parts on which they are inserted. Their fibrous nature can be demonstrated with a probe or by the forceps, as they readily escape from the grasp of the latter.

If the fibroma is on one of the vocal cords, inflammation and desquamation of the opposite cord usually occur, sometimes



FIG. 163.—FIBROMA OF THE FREE BORDER OF THE VOCAL CORD. (COUPARD.)

even with loss of substance, in consequence of the friction on it of the neoplasm. This is a regular occurrence in the case of hard tumours situate on the free edge of the vocal cords.

**Myxomata.**—Those tumours, considered rare, when diagnosis was based more on the external appearance than

on histological examination, are usually seen in the larynx. They are soft, rosy, smooth and sessile, and generally unilobular. They sometimes present two or three small projections, recalling œdematous aryepiglottic folds. Besides this gelatinoid appearance, they are characterized by the existence of a reticulated mucous tissue.

**Adenomata.**—Those are very rare, and accordingly not well known, and may be due to hypertrophy of the laryngeal glands.

**Lipomata.**—As there is no adipose tissue in the larynx, lipoma is rarely met with in that organ. When it does occur, it is usually seated on the epiglottis. The tumour

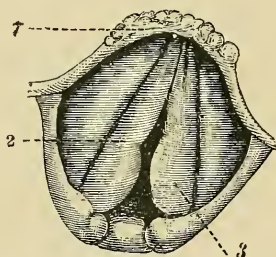


FIG. 164.—MYXOMA OF THE TWO VOCAL CORDS.  
(DRAWN FROM NATURE.)

1, Fringed and eroded epiglottis; 2 and 3, vocal cords, having the appearance of two soft œdematous mucous polypi.

exhibits a smooth, shining surface of a light rosy, somewhat yellowish colour, and is of a soft, elastic consistency. Its shape is frequently irregular. It contains fat cells, connected by fibrous connective tissue, and partly filled with crystallized margarine.

**Angiomata.**—Those are equally rare in the larynx. At first sight they recall cysts, from which they differ by their darker coloration and the presence of hæmorrhages. Their size is usually that of a currant. Sometimes angiomata are more voluminous and of an irregular form. Those tumours must not be confused with blood-cysts. The latter are much more frequent, and have a smooth, light red colour, and when the cyst wall is opened, slight hæmorrhage takes

place, usually due to a vascular rupture in the cyst wall, or to the pseudo-cystic dilatation of a laryngeal polypus.

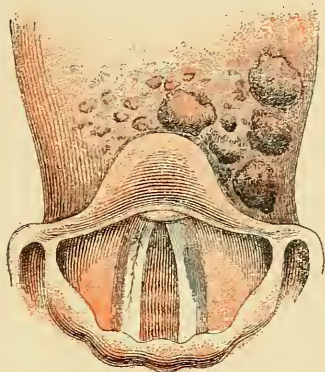


FIG. 165.—ANGIOMATOUS TUMOUR OF THE LARYNX AND OF THE BASE OF THE TONGUE. (FROM NATURE.)

**Enchondromata** generally originate in the exaggeration or in the deviation of physiological activity, but at other times they have a pathological origin (tuberculosis, syphilis). Apart from chronic inflammation of the vocal mucosa (tuberculosis), these tumours appear when the larynx becomes ossified.

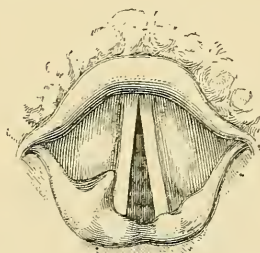


FIG. 166.—ENCHONDROMA.

They occupy the cricoid, sometimes the thyroid, and very rarely the arytenoids. Their appearance is that of the mucosa, which covers them, and which may remain mobile. Although sometimes lobulated, they are always smooth and even on their surface.

Enchondromata are sometimes recognizable from the



external deformity produced; the thyroid is often swollen; and, if the neoplasm is seated on the cricoid, the latter presents an irregular tumour projecting into the larynx or below the cords.

The *prognosis* of enchondromata is particularly grave, as they may on account of their bulk produce laryngeal stenosis. Fortunately their course is slow, and they are seldom voluminous enough to block the glottic orifice. Owing to their hardness, they generally necessitate thyrotomy.

**Mixed Tumours.**—As a rule, tumours of the larynx do not present the well-defined characters above referred to, but the various elements are combined, and constitute fibromyxomata, angiomyxofibromata, angiomyxomata, fibrosar-

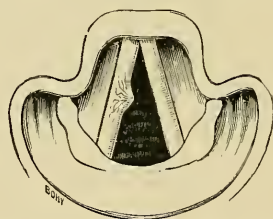


FIG. 167.—NODULE ON THE FREE EDGE OF THE RIGHT VOCAL CORD (ANGIOKERATOMA).

comata, chondrofibromata, angiokeratomata. Sometimes cavities are observed in these neoplasms, containing a serous, colloid, or hæmorrhagic fluid (hæmorrhagic fibromyxomata).

*Course.*—The course of the benign laryngeal tumours is generally slow. Apart from the cysts, angiomas, etc., which develop with comparative rapidity, their evolution may take from fifteen to twenty years. Life may be endangered on account of their volume.

Termination sometimes takes place by spontaneous expulsion (diffuse papilloma), or by rupture of the cyst wall. This usually occurs during a violent effort, as sneezing or spasmodic coughing. In rare cases the tumours terminate in degeneration or ulceration with suppuration.

Semon has established, (1) that benign tumours of the larynx seldom become malignant after intralaryngeal opera-

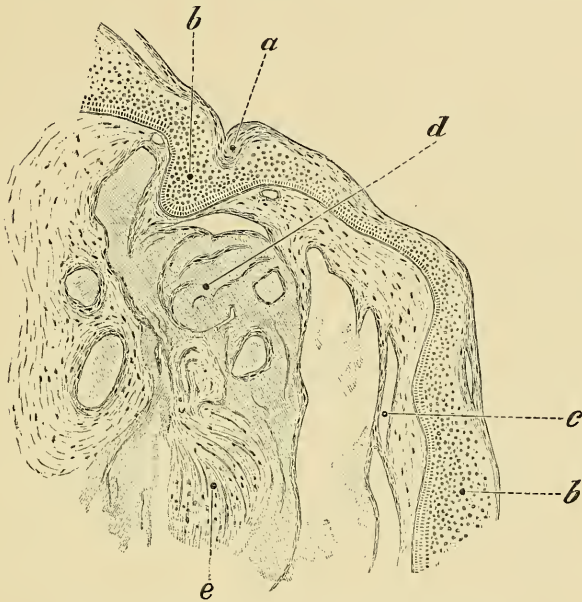


FIG. 168.—HISTOLOGICAL SECTION (SABRAZÈS).

*a*, Keratinized zone; *b*, thickened epithelium; *c*, cellulo-mucous chorion hollowed with fissures; *d*, angiomatous mass; *e*, fibrous transformation of the angioma.

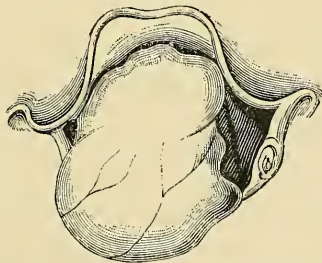


FIG. 169.—VOLUMINOUS TELANGIECTASIC TUMOUR, OCCUPYING THE INTERIOR OF THE LARYNX. (AFTER BOTHEY.)

tions; (2) that the operation has no influence on the transformation, when the latter does occur.

The author also thinks, that a careful diagnosis corroborates the above opinion, as in some alleged cases the tumour was malignant from the first.

*Diagnosis* of laryngeal polypi is generally easy once the vocal cords have been freed from mucus. In the case of children, owing to their resistance and the depression of their epiglottis, it may be necessary to use Kirstein's or Escat's instruments.

Once the neoplasm has been seen, its nature remains to be determined. As a rule, this is revealed only by microscopic examination.

Edema of the cords sometimes has the appearance of a myxoma or of a cystic tumour, but serous effusion is always accompanied by inflammatory symptoms.

Tuberculous and syphilitic vegetations are distinguished by characteristic lesions, and cannot be mistaken by an expert eye. Pseudo-polypoid forms of tuberculosis are recognized only on histological examination.

The *prognosis* of benign laryngeal tumours varies according to the age of the patient. In the case of intractable children, intervention is awkward and often impossible, and besides, the narrowness of the glottic orifice increases the danger, when the polypi become bulky. In adults the prognosis is good, except when asphyxia occurs from a voluminous tumour before laryngoscopic examination has been made.

A bulky pedunculated tumour situate on the ventricular bands or the aryepiglottic folds may fall into the air tract, and cause death from suffocation.

Diffuse papillomata may block the glottic orifice and necessitate the opening of the trachea. They are more difficult to remove by the natural tract than the other polypi, and may also recur. Finally, in some very rare cases they may develop into malignant tumours. Cysts do not recur, probably owing to the fact that the continuous movements of the vocal mucosa do not allow the walls to reunite. Fibromata, being usually sessile, are difficult to extirpate completely; but since cocaine has been used in

intralaryngeal operations, even the smallest fibromata can be removed.

The prognosis of enchondromata is less favourable, as they generally necessitate thyrotomy, or even partial laryngectomy, owing to their extent.

The extirpation of angiomata is sometimes accompanied by serious hæmorrhages, which may require tracheotomy and tracheal plugging, either with Trendelenburg's canula, or with gauze introduced through the natural tract. Application of adrenalin renders post-operative hæmorrhage rarer and less abundant.

The vocal prognosis is usually favourable. Whenever the operation through the natural tract is possible, as is the rule, the voice is restored to its normal state. The removal of a fibroma situate on the free edge of a cord may leave a certain change in the singing voice, especially in tenors and soprani. On the contrary, a practised operator may remove the neoplasms, even in the case of singers, without leaving any trace behind.

*Treatment.*—Abstention may be advised in the case of small neoplasms occupying the lingual surface of the epiglottis or the ventricular bands; but the treatment is so simple that all tumours of the larynx should be removed, especially if they interfere with phonation or respiration. Two methods can be employed—the endolaryngeal and the extralaryngeal. Since local anæsthesia of the larynx has been adopted, the operation through the natural tract is so easy, that the external method is necessary only in exceptional cases.

1. *Endolaryngeal Method.*—If the patient is intelligent and tractable, the removal of most of the laryngeal polypi *per vias naturales* is painless, almost bloodless, and without danger.

The vocal mucosa is anæsthetized by an insufflation of sugar and cocaine (1 : 10), or by an instillation of a solution of cocaine in water (1 : 10). This anæsthesia is completed by repeated paintings (four, five, or even ten times). In certain patients it is necessary to use solutions at 1 : 5,

to which may be added a few drops of adrenalin solution (1 : 1,000).

The practitioner, if right-handed, takes the mirror in

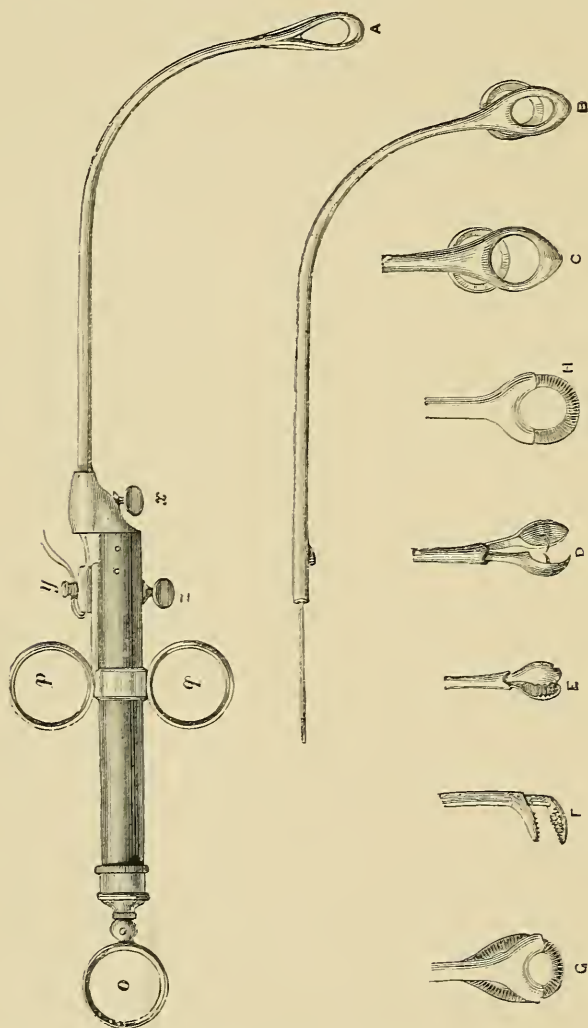


FIG. 170.  
A, B, C, H, Various guillotines (Stoerck); D, E, F, forceps; A, wire ecraseur; p, q, o, rings for holding the instrument.

his left and the forceps in his right, and requests the patient to keep hold of his tongue with his left hand. Guided by the laryngeal mirror and under good light, the operator



directs the instrument towards the tumour, and tries to seize it without injuring the subjacent parts.

The instruments employed are various. It may be said

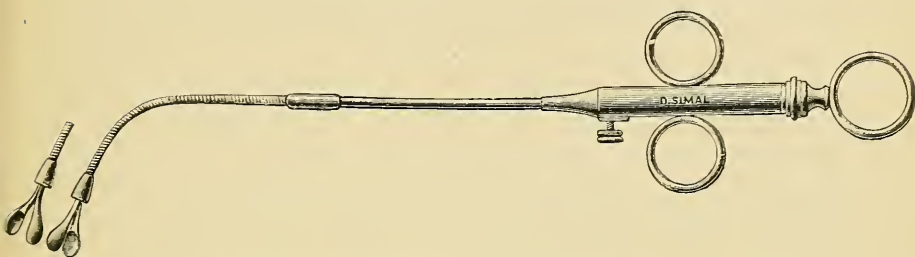


FIG. 171.—MORITZ-SCHMIDT'S INSTRUMENT FOR POLYPI OF THE LARYNX, THE BLADES OPENING IN ALL DIRECTIONS.

that each operator has his own particular forceps. For a long time in France Fauvel's forceps, on the model of which others have been made, was used almost exclusively.

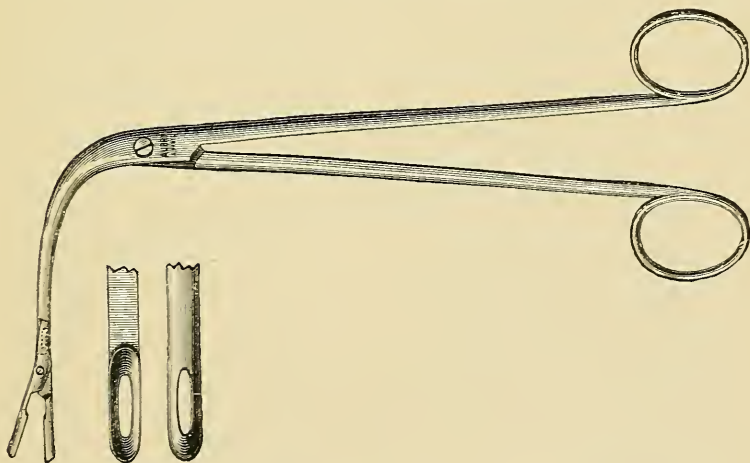


FIG. 172.—CUTTING FORCEPS OF DR. RUAULT, ACTING Laterally and FROM BEFORE BACKWARDS.

Stoerck, Schrötter, Krause, and Héring recommend the employment of a varied series of instruments of slighter structure, a tube of laryngeal curvature, in which slides a rod, which carries at its free end forceps, small spoons,

guillotines, snares, or even curettes, whose form and direction vary according to the requirements of the case.

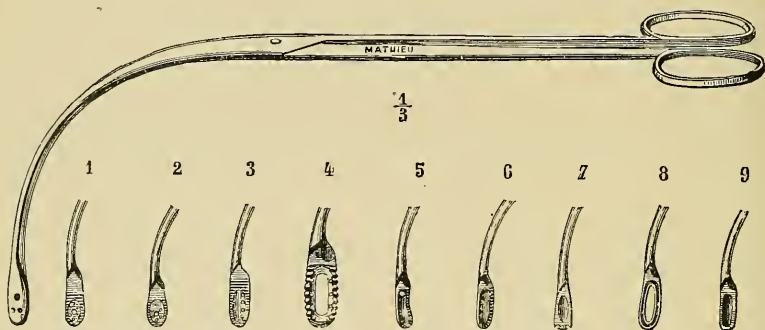


FIG. 173.—FORCEPS FOR LARYNGEAL POLYPI (FAUVEL), WITH ASSORTED BLADES (SHAPE, SIZE, STRENGTH) FOR CHILDREN AND ADULTS. (MATHIEU.)

Though this extreme mobility of the extremity of the instrument makes it very delicate, yet the steel thread rusts

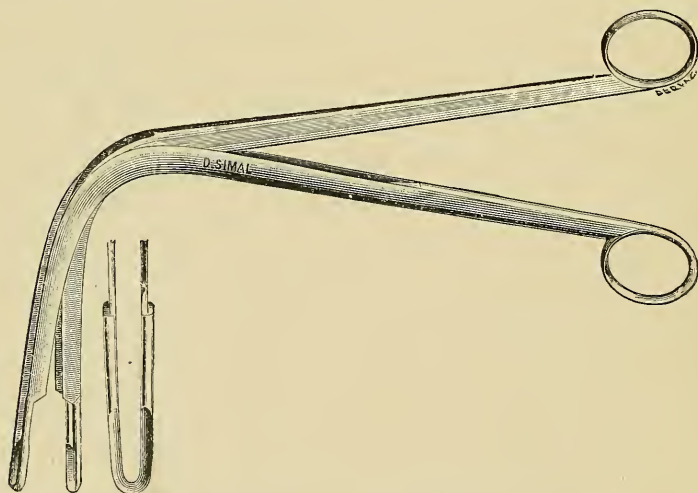


FIG. 174.—DE MENDOZA'S ANTERO-POSTERIOR LARYNGEAL CUTTING FORCEPS.

in its sheath, becomes more brittle, and may snap during an operation, and fall into the larynx. Therein lies the disadvantage of those complicated instruments, which the

author has long abandoned. Those sliding forceps have also the drawback of re-entering their tube, when they should grasp the neoplasm. Practice with the instrument overcomes in a short time this difficulty. On the contrary, the handling

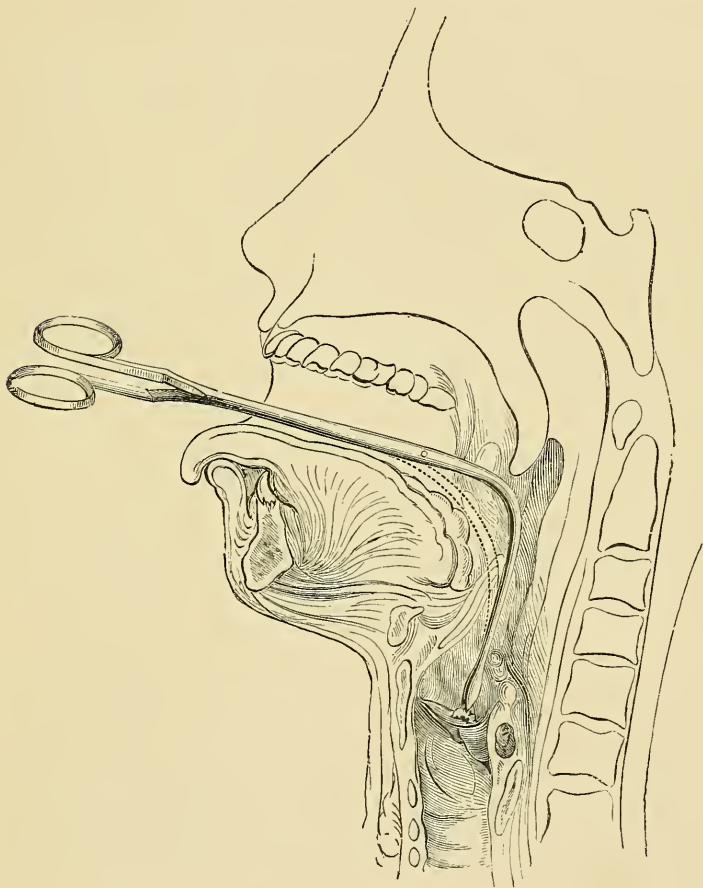


FIG. 175.—DIRECTION OF THE FORCEPS AT THE MOMENT OF EXTIRPATION OF A POLYP OF THE VOCAL CORD.

of those forceps is easy. They are specially useful in cases of small polypi inserted on the edge of the vocal cords or in their anterior angle. Moritz-Schmidt's forceps is also very suitable for cases of that kind. In France, Ruault has also

constructed a series of composite forceps, which in skilled hands give very good results, especially when the morbid productions are sessile, fairly large (grain of wheat, a pea, etc.), and hard in structure.

In a general way, the author is of opinion that instruments made of one piece, having shapes varying somewhat according to situation of the lesions, should successively be used for operation in the larynx. De Mendoza's forceps is adapted specially for beginners or operators but slightly acquainted with endolaryngeal interventions. In some cases preference is given to the curette, which is mainly used for small papillomata or certain muriform tumours of the re-entrant angle of

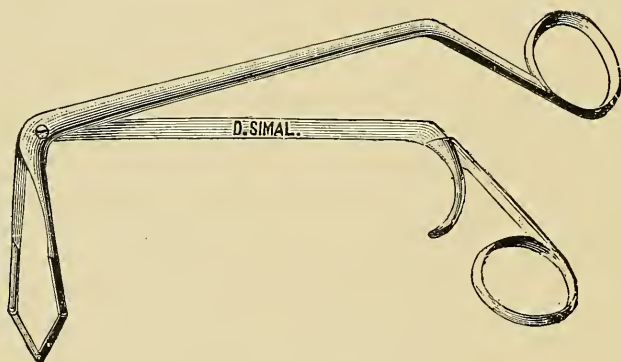


FIG. 176.—DUNDAS GRANT'S FORCEPS.

the cords. With an inadequate *point d'appui* the operation with the curette is not so easy and simple as it at first appears, and, as a rule, is not so satisfactory as extirpation.

The time at which the removal is to be made varies according to the form and nature of the neoplasms and their mode of implantation. It is thus that pedunculated tumours should be removed during phonation, and small sessile growths on the edge of the cord during inspiration.

For cysts crushing is sufficient. These tumours should be operated on either with cutting forceps, in order to remove a part of the cyst wall, if they are voluminous, or with a guarded bistoury or the galvanic knife, in order to empty their contents.

In some cases of small, hard, and sessile tumours the galvano-cautery may be employed. This requires a practised hand.

Electrolysis is almost abandoned. Its application is

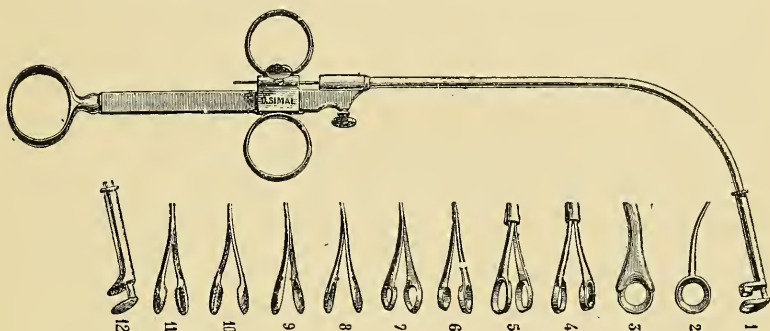


FIG. 177.—SERIES OF INSTRUMENTS (KRAUSE): VARIOUS FORCEPS.

rather difficult, and is suitable only for very vascular polypi (angiomata).

The endolaryngeal method may also be employed in the case of voluminous tumours causing continuous dyspnœa and even fits of suffocation. The only danger to be feared

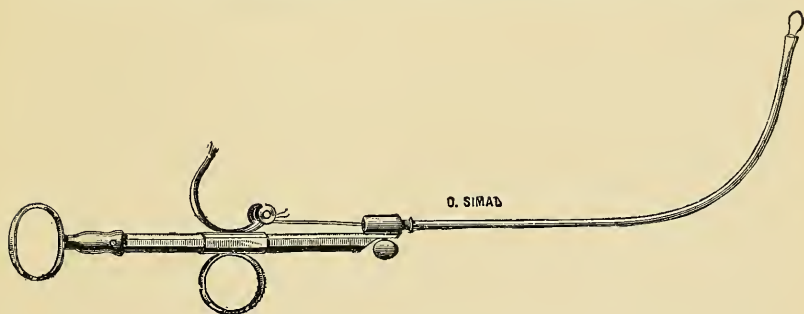


FIG. 178.—LARYNGEAL POLYPOTOME.

is not the spasm, but rather the hæmorrhage, if the tumour contains important vessels, or if it is in the process of sarcomatous degeneration.

When benign tumours of the larynx are removed, the



voice as a rule is immediately restored to its normal condition. It afterwards becomes husky during the post-operative inflammation (about three weeks).

2. *Extralaryngeal Method*.—This may sometimes be necessary, as in children affected with voluminous tumours endangering life. Similarly certain recurring diffuse papillomata

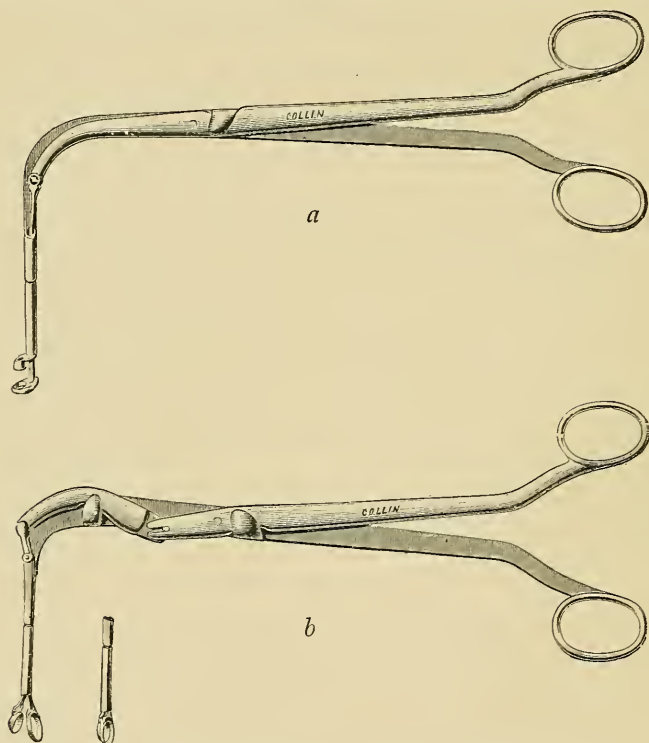


FIG 179. — MAHU'S LARYNGEAL FORCEPS.

*a*, Acting from below upwards; *b*, laterally.

yield only to curetting after laryngo-fissure; and it is indispensable in those cases that the patient should retain the canula for several months. With some children the protracted use of the tracheal tube is sufficient to cure papillary degenerations of the larynx without the necessity of opening and curetting that organ. Likewise ankylosis of the jaws and certain deformities of the tongue make the external

method obligatory. Enchondromata generally necessitate opening of the larynx. Three methods of procedure may then be adopted :

1. Thyrotomy (laryngo-fissure), or vertical division of the thyroid cartilage in the middle line.
2. Transverse subhyoid laryngotomy, or division of the thyro-hyoid membrane.
3. Subhyoid laryngotomy, or division of the crico-thyroid membrane.

### **Nodular Laryngitis.**

This is a variety of circumscribed hypertrophy of the vocal mucosa, generally localized in the anterior or in the posterior third of the cords.

*Etiology.*—Nodular laryngitis, known as singer's nodules, nodular hyperplasic chorditis, singer's chorditis, inflammatory nodule, etc., is observed in singers, speakers, teachers, etc., abusing their voice, and is more frequent in women and in subjects possessing a small larynx (soprani, tenors). Those localized hypertrophies are also common in children, and in this case they often persist till adolescence.

*Pathogeny.*—This disease probably originates in the irritation of the cords due to exaggerated and continuous efforts during phonation and singing, and more especially to displacement of the voice.

If the nodules occur more frequently on the anterior third of the cords, it is owing to the fact, that this portion of the glottic orifice closes, when the chest voice is changed into falsetto. Besides, in the case of hypersecretion of the mucosa, mucus always gathers on the anterior part of the cords and on their free edges, forming there a milky secretion, which vibrates during phonation and constitutes, first, an irritation at this part, followed by a local hyperplasia. The posterior part is less often affected, because the ary-arytenoid muscle relieves the cords at this level.

Sometimes after vocal fatigue small projections of nodular appearance are observed. They are consequent on a muscular relaxation localized at the junction of the anterior third with the posterior two-thirds. These are rather muscular pareses

of the thyro-arytænoideus (internal fibres), than true hyperkeratoses.

*Symptoms.*—In subjects affected with nodules, phonatory disturbances predominate. The latter are allied to the lesions of catarrhal laryngitis, which almost always accompany these neo-productions.

The vocal alterations are easily observed in singers, when they wish to use the 'half-tone.'

On the contrary, during the emission of low sounds there

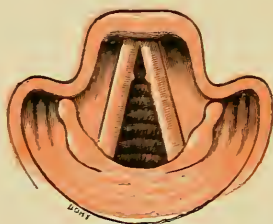


FIG. 180.—NODULES ON THE ANTERIOR THIRD OF THE TWO VOCAL CORDS. LARYNX SEEN DURING INSPIRATION.

is almost nothing perceptible. The singer—at least, at the outset and in slight cases—may overcome the obstacle, which momentarily clogs his cords, and make his voice tolerably clear.

Occasionally, by listening closely, diphonia or double

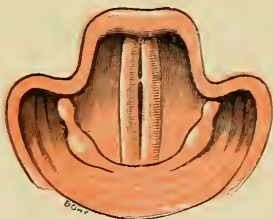


FIG. 181.—NODULES SEEN DURING PHONATION.

There exist two glottic orifices.

voice is heard. This phenomenon consists in the production of two sounds simultaneous with the vocal emission. The superadded sound is usually feebler, and forms with the main sound a perfect third or sometimes an octave. The explanation of this phenomenon lies in the fact, that the

vocal cord is divided into two vibrating parts: one being anterior, very short, and issuing from the re-entrant angle of the cords to the nodulary point; and the other being posterior, longer, and extending from the anterior contact to the arytenoid region.

Except complications there are no other functional disturbances. Nevertheless, the subjects affected develop in the interior of the larynx mucous secretions, which they endeavour to get rid of by repeated 'hemming.'

*Objective Symptoms.*—The laryngoscope is indispensable to diagnosis. With it may be seen the integrity of the vocal mucosa, or a slight catarrhal condition of the cords, which have lost their pearly appearance, and which present on their free edges, or, as is more frequently the case, in their anterior third, two small symmetrical projections. Those latter are acuminate or rounded and sessile on the mucous membrane. They resemble a small pin-head or a grain of millet. When these nodulary thickenings attain a more considerable volume, they then become true laryngeal polypi. During phonatory efforts these nodules come in contact with each other, and thus hinder the vocal cords from adducting during their whole length. It frequently happens, that one of the nodules is more bulky than its fellow; sometimes the lesion only occupies a single cord. It is not rare, in somewhat old and grave forms, to see at the same time the existence of paretic disturbances bearing on the ary-arytænoideus, or more frequently on the internal fibres of the thyro-arytænoideus.

Similarly, during laryngoscopic examination the nodules are frequently seen covered with a whitish viscous creamy secretion, adherent to the subjacent mucous membrane. This secretion vibrates with the cord during phonation.

During inspiration the nodules appear on the surface of the cords, their edges almost blending with the surrounding healthy mucous membrane. At other times a fine vascular network accompanies the hyperplastic projection.

*Diagnosis* is generally easy. The profession of the patient and the aspect of the lesion are so characteristic, that it is

difficult to confuse the nodules with other lesions. The cystic dilatations are usually single and more projecting than the nodules; they are often transparent.

*Pathological Anatomy.*—According to Sabrazès and Frèche, the nodules are constituted histologically of hypertrophies confined to the epithelium and the mucous chorion. Sometimes the thickening of the epithelium is predominant, and in those cases either the hyperplasia concerns the different cellular layers, or bears more particularly on one of them, and is accompanied either by a hyperkeratosis or by an exaggerated multiplication of the polyhedral cells, and sometimes the chorion reacts and forms papillary projections. Most frequently the epithelium and the chorion participate in the thickening. This is the more appreciable, as the mucous coat of the free edge of the vocal cords is normally very thin, measuring from 23 to 26  $\mu$  (Heymann).

In a case of nodule operated on by the author, M. Sabrazès observed a double cystic degeneration, and, according to him, those dilatations are present *en germe* in most nodules of this description.

The encysted cavities found on examining histological sections of nodules are due either to the dilatation of vessels and the lymphatic spaces (Chiari), or to mucous degeneration of the chorion (Sabrazès), and very rarely to glandular cysts (Fraenkel).

According to Garel and Bermond, certain nodules may be compared to myxomatous or fibro-myxomatous buds of the nasal fossæ.

*Course, Duration, Termination.*—The course of nodular laryngitis is slow. It undergoes modifications and arrests in development, according as the persons affected continue their ordinary profession, and particularly the vocal abuse which brought on the affection; or if they, on the contrary, bring about the disappearance of the morbid changes, before these are completely established.

When the nodule appears as a final symptom of muscular fatigue in singers, prognosis is generally grave—not on



account of the projection, which it occasions on the edge of the cords, but on account of the muscular disturbances, which accompany it.

The duration is very long, when hyperplasia begins, sometimes extending to years. It is difficult to say, if recurrence is frequent, as no mention has been made of it as yet by authors, who have studied the subject, though cases of cure have been generally noted.

*Prognosis* is benign, so far as general health is concerned. It is only grave from a professional point of view, especially

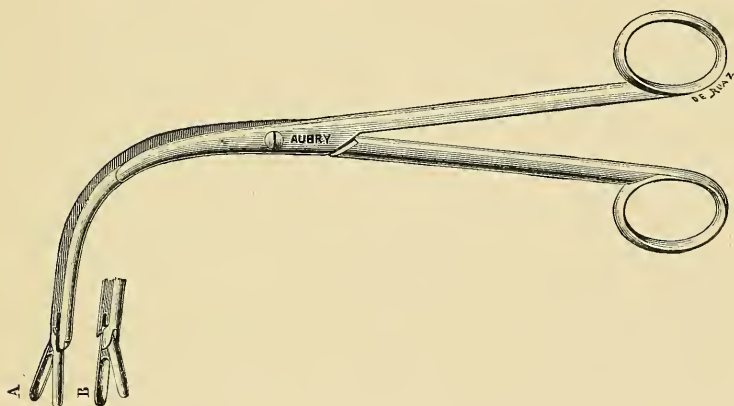


FIG. 182.—MOURE'S ANTERO-POSTERIOR LARYNGEAL FORCEPS.

in singers. On the contrary, it is almost the rule to see infantile nodules disappear with age.

*Treatment.*—The causes, which have given rise to the nodule, should first be suppressed—*e.g.*, exaggerated efforts and displacement of the voice in singers, and crying in children. The nasal fossæ should be free. This is a frequent case of over-fatigue of the larynx in persons overstraining their voice.

Finally, and above all, apply a remedy to the over-fatigue, or rather the misuse, of the larynx, of which the nodule is almost always the expression. Rest is the primary consideration. Hygienic treatment and precautions are often

sufficient to make the small commencing projections disappear, and, if the person so affected does not fall back into

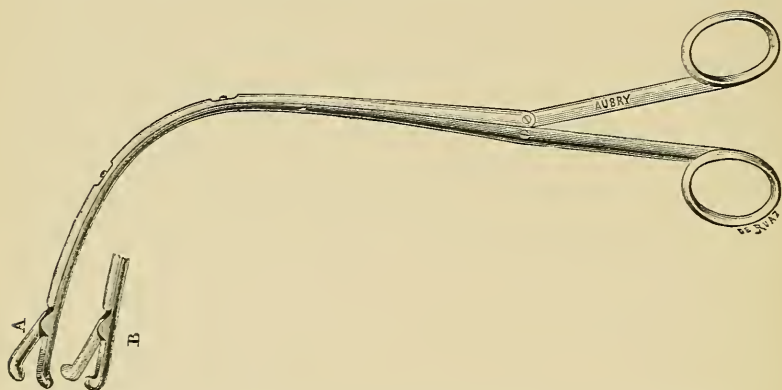


FIG. 183.—MOURE'S LATERAL DOUBLE-EDGED LARYNGEAL FORCEPS.

A, To the right ; B, to the left.

the same errors as brought on the first vocal disturbance, the affection may disappear for ever.

On the contrary, in graver cases when the nodule is perfectly established, when true local hyperplasia exists, and

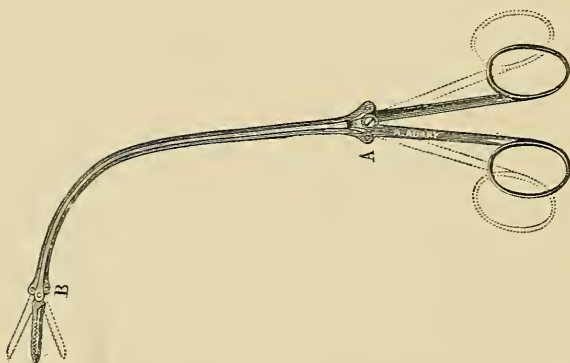


FIG. 184.—AUBRY'S LARYNGEAL FORCEPS WITH MOVABLE MOUNT.

rest does not make it completely disappear, though it diminishes it to a certain extent, the sole treatment to employ is removal of the projecting portion. Once the vocal mucosa

is anæsthetized, the operator should, with forceps of small calibre, seize, and remove with a single cut, the nodular projection to the base of its insertion, without injuring the subjacent vocal cord. When this operation is over, the base

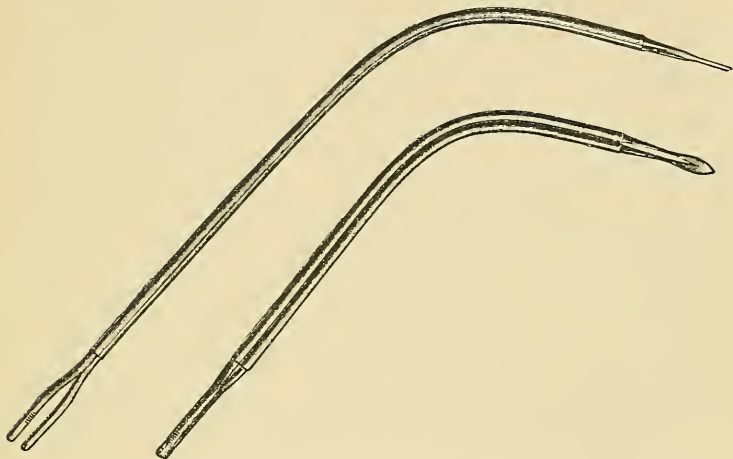


FIG. 185.—CAUTERIES FOR THE LARYNX.

should be painted with a solution of zinc chloride (1 in 15). The patient should be left at rest for several months if he is a singer, or for several weeks if a teacher or subject who may only require a speaking voice.

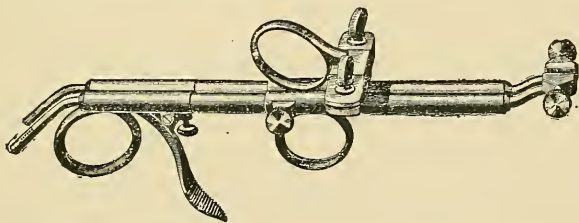


FIG. 186.—UNIVERSAL HANDLE FOR CAUTERIES AND SNARES.

In much graver cases, accompanied with a true relaxation of the whole mucous membrane of the cords, the operation recommended by Labus (decortication of the cords) should be performed. A portion of the glottic mucosa should be seized in a forceps, and an attempt made to strip the whole

free edge of the affected cord. This intervention will necessitate at least a six or ten months' rest, so that a mucous membrane of new formation may acquire the strength necessary for vocalization.

This practice should be reserved for the gravest cases. At other times, if the practitioner is familiar with laryngoscopic manipulation, he may cauterize the nodule with the galvano-cautery at a dull red heat. Care must be taken not to make too deep a cauterization. It is better to repeat the burning, than to destroy too much at first.

Sprays of a sedative nature should complete the above surgical treatment. In paretic forms electrical treatment, massage, with regular and methodical vocal exercises, not overdone, are useful.

### **Eversion of the Ventricles.**

This forms, as it were, a corollary to benign tumours of the larynx, and is well known. It does not consist, as the title of this chapter appears to indicate, in luxation inwards of the mucous membrane of the ventricle of Morgagni, but in a more or less considerable projection of the mucous membrane, which lines these cavities. Cases of this kind, formerly considered rare, are being commonly observed, since Fraenkel's monograph on the subject.

The ventricular tissue, being closely adherent, making, as it were, one with the perichondrium of the thyroid cartilage on the one side and with the base of the epiglottis and the arytenoids on the other, cannot possibly be luxated and everted inwards. Accordingly, even when the projecting portion is very considerable, we have not to deal with a true ventricular eversion, but with an inflammatory ridge connected with the deep tissue and blending with it.

*Etiology—Forms.*—The lesion may supervene in acute form after a simple catarrh. Most frequently this abnormal projection is consequent on chronic inflammations of the laryngeal mucosa, and occurs by preference in people exposed to the usual causes of chronic laryngitis (irritating dust, vapours, singers and speakers).

It is common to see the prolapsus suddenly supervene (Lussan).

At the first stage a mere redness is observed on the inferior edge of the ventricular band, the rest of the vocal mucosa being perfectly healthy (Stoerck).

Functional disturbances, merely vocal, can be noticed only in singers, more particularly in soprano and light tenor voices.

At the second stage the orifice of the ventricle disappears, and is replaced by a small projection. Instances of this inflammatory prolapsus are common in infectious laryngitis (tuberculosis, syphilis).

At the third stage the ventricular tumour, owing to the increasing proliferation of the connective tissue, assumes the appearance of a polypus with a sessile base occupying the ventricular space.

To this stage is applied the name of eversion of the ventricles.

*Symptoms.*—Functional symptoms are almost nil at the beginning, except in singers, whose voices rapidly become exhausted and sometimes husky. At this period the symptoms pass unperceived, as they may as well belong to any other simple laryngitis. It is only at the confirmed stage, when the mucosa is projecting and covering partly or completely one or both vocal cords, that vocal disturbances are pronounced. The voice is veiled, even aphonic, and stifled, if the tumours are bulky.

Respiration is not changed in its rhythm, unless the two prominent ventricular mucous membranes make the glottic orifice noticeably narrower. Even in that case, if the arytenoids are mobile, there passes into the intercartilaginous glottis sufficient air to prevent dyspnœa from being intense. Exception is, of course, to be made in cases, where eversion is symptomatic of a neoplasm, or of a grave lesion of the vocal mucosa.

Cough is absent, except in acute forms, and it is then, as a rule, consequent on lesions accompanying ventricular tumefaction.

According as the projection is uni- or bi-lateral, laryngo-



scopic examination shows on one or two sides of the larynx either a simple swelling masking the ventricular orifice, or, in more pronounced cases, one or two tumours, smooth on their surface, occupying the whole external part of the larynx, and more or less covering the underlying vocal cord, and connected with the ventricular band by a small excavation, often difficult to perceive, so that the ventricular band seems to be one with the mucosa.

The swollen parts are slightly redder than the rest of the vocal mucosa. Under the probe they are resilient, softish, sometimes even partly reducible. In some cases the bulk of the tumour diminishes after painting with a solution of adrenalin and cocaine. It may even be almost entirely reduced, but projects again soon afterwards into the laryngeal orifice. When bulky, it is seen to move to and fro during phonation and inspiration. Sometimes the ventricular mucosa is seen during movements of deep inspiration.

Eversion may occupy only the anterior or posterior part of the larynx, forming there a small smooth tumour, blending with the ventricular band. Those partial tumefactions are not uncommon.

*Diagnosis.*—Diagnosis is not always easy, as a ventricular tumour (angiomyxomatous polypus, cysts, etc.) may simulate a ventricular eversion.

A careful examination usually ensures an exact diagnosis by determining whether the tumour is merely inflammatory and catarrhal, or, on the contrary, secondary to syphilis, tuberculosis, or to even a malignant tumour of the larynx.

In rarer cases histological examination alone is able to settle the diagnosis.

*Treatment.*—Some authors formerly advised reduction of the ventricular mucosa by means of the probe and by painting the inflamed region with astringent solutions, but this treatment fails in most cases.

Chemical or galvanic cauterization should be applied to incipient hypertrophy; but the author thinks, that voluminous tumours should be removed with the cutting forceps in the same way as polypi, at one or several sittings,

according to their size. The neoplasm may sometimes be removed by thyrotomy, the incised thyroid cartilage being immediately reunited.

Galvano-cautery should be employed in some cases after removal, either to arrest hæmorrhage or to shrivel up the parts of the mucosa injured by the forceps.

### Laryngocele.

Though known for a long time, this is not a very common tumour.

*Etiology.*—The cause of laryngocele is the same as that of tracheocele. It may in a general way be admitted, that those gaseous tumours are produced by rupture of the air tract and by effusion of air into the neighbouring regions, or through hernia of the soft parts, between the cartilages of the larynx. These two lesions follow a traumatism or a violent effort (*e.g.*, a fit of coughing) of any kind. The author once saw a hernia of the laryngeal mucosa, at the level of the middle part of the ventricle of Morgagni, in the course of a spasmodic bronchitis. Sometimes the formation of those tumours is facilitated by particular anatomical dispositions (ventricular laryngocele), consisting in a prolongation of the ventricles of the larynx to the level of the hyoid or even of the sublingual mucosa.

*Symptoms* are almost similar to those of all the gaseous tumours in the region of the neck. Generally, their site, smooth, rounded shape, their reduction by pressure or massage, and their resonance, when the projection is bulky enough to be percussed, are characteristic signs of laryngocele.

It is not always easy to reduce the tumour, as the orifice of its communication with the larynx may be very narrow. In those cases the nature of the distension of the sac and its gaseous consistency are recognized with difficulty.

*Prognosis* is generally benign, as the lesion has, if treated, no tendency to extend, provided the patient does not expose himself to over-violent efforts.

*Treatment* depends on the volume of the tumour, site of the lesion, and the disturbances produced. It may be left alone or the tumour simply restrained by a plug of cotton-wool,

etc. At other times removal of the distended sac should be carried out, an incision being made on the tumour and the bag resected. The lips of the mucous membrane are joined by a continuous suture, the tissue of the larynx with catgut, and the skin with horsehair. This operation is not always easily effected, as it is difficult to get at the sac, which cannot be inflated during the operation; yet, if the patient's life is endangered, such is the sole resort.

#### MALIGNANT TUMOURS (CANCER OF THE LARYNX).

*Etiology.*—This affection may be said to occur exclusively in adults, especially between forty and sixty, although some cases have been observed in children. Men are more exposed to it than women, owing, perhaps, to abuse of tobacco, alcohol, or vocal effort, or probably to the individual structure of the larynx. The author attributes it chiefly to heredity or to certain obscure predispositions of the individual.

Cancer of the larynx is rather common in subjects, who have a vigorous appearance (arthritic people).

The author has seen an example of a secondary malignant tumour in the larynx, consequent on cancer of the rectum (epithelioma).

Finally, certain benign tumours may become malignant.

Malignant tumours may be classified into two groups: (1) extralaryngeal, and (2) intralaryngeal.

(a) *Functional Symptoms.*—Those are vague at the outset, may pass unperceived, and vary somewhat, according to the site of the neoplasm. In intralaryngeal tumours on the vocal cords alteration of the voice constitutes the first symptom, and may precede for three, four, or five years the confirmation of the nature of the malady. As the tumour increases in bulk and develops, the voice becomes raucous, rough, unequal, and, as it were, 'wooden' (Fauvel). At a more advanced stage it is veiled, even aphonic, and the patient appears to speak without using his vocal cords.

When the tumour is extralaryngeal, the disturbances of phonation are absent for a fairly long time, while those of deglutition, on the contrary, appear rather early. At first

the patient complains of a slight pain at the time of the passage of the bolus. Modifications of the voice only appear, when the entrance of the larynx is more or less obstructed by the tumour, or, when a side of the larynx is immobilized through infiltration. Cough is rare at the beginning. In extralaryngeal tumours, there is less a true cough than a desire to clear the throat.

Expectoration, absent at first, later on becomes mucoid, muco-purulent, purulent, and even sanious. The presence of blood in the secretions is an important element in diagnosis.

At a more advanced stage expectoration chiefly consists of saliva, which the patient can no longer swallow.

Respiratory disturbances, hardly appreciable at first, vary later on, according to the site and the volume of the tumour. When the latter is inside the larynx (ventricular bands, cords), respiratory difficulty occurs very early, and may become intense, the cords being immobilized, and the neoplasm partly obstructing the glottic orifice.

If the swelling occupies both sides of the larynx, the two arytenoids are immobilized, the air passes with great difficulty, and there results from that condition a harsh respiration—‘wooden’ (ligneuse), Fauvel.

In this form of endolaryngeal cancer and at this stage respiration is noisy, fits of suffocation occur on the least irritation, and the patient may die suddenly, if the trachea is not opened.

When the tumour is extralaryngeal (epiglottis, aryepiglottic folds, œsophageal orifice), respiratory disturbances, apart from exceptional cases, appear at the very last stage of the lesion. When the growth fills the pyriform cavity and from the infiltration immobilizes one or both sides of the larynx. Exceptionally also do we see early asphyxia. It is only when the neoplasm has then acquired an excessive volume resembling a mushroom with a broad peduncle, and if aspirated during inspiration, will cause asphyxia. At this stage deglutition is so much compromised and the patient so profoundly cachectic, that there is sometimes hesitation in performing tracheotomy. It must not be forgotten, however,

that those extralaryngeal cancers invade the œsophagus, and the larynx is immobilized in a neoplastic mass, involving also the trachea and the nerves of the region (pneumo-gastric, superior laryngeal, recurrences), so that the opening of the air tract does not afford any respiratory relief to the patient.

*Pain*, absent at the outset, becomes pronounced, when the tumour reaches the stage of confirmation. It appears earlier in the case of extralaryngeal neoplasms, and persists till the end of the lesion. The pain is characterized by being spontaneous, shooting, and by radiating not only towards the corresponding ear, but also to the nape of the neck and the vertex. It may be roused and intensified by movements of deglutition, or by any other disturbance of the part. This spontaneous neuralgic pain is very exhausting, and it is particularly acute in the ear, when the neoplasm occupies one of the ary- or glosso-epiglottic folds.

Salivation is specially abundant in the case of neoplasms situate outside the larynx, owing to the difficulty of deglutition and to the exaggerated secretion of the salivary glands. The saliva is generally thick, viscous, and sanious. The expectoration is muco-purulent, or even purulent, and sometimes contains detritus of sphacelated tumour, and is frequently mixed with blood, being at times completely hæmorrhagic. The latter fact constitutes an important element of diagnosis (Fauvel). Hæmorrhages chiefly occur in extralaryngeal tumours, and may be sufficiently abundant to endanger life.

One of the foregoing symptoms often predominates, according to the seat of the tumour.

(b) *Objective Symptoms*.—If the symptoms experienced by the patient suggest the diagnosis, laryngoscopic examination alone enables us to verify the lesion, to ascertain its site, its form, and its morphological character.

When the cancer starts in a ventricular band, a mere swelling of a deep red hue is at first perceived, accompanied by slight œdema of the neighbouring parts. The swollen region is not smooth and even, but is somewhat mammillated. If the lesion is situate posteriorly, the corresponding ary-



tenoid soon becomes slightly infiltrated and less mobile than its fellow. Should the neoplasm occupy one of the vocal cords, it then appears, and especially in old people, as a greyish tumour of a villous, papillary appearance, attached by a broad base to the vocal cord, which is swollen, uneven, and rosy in places. At this stage there is no peripheral œdema, and the cancer might be mistaken for a small diffuse papilloma, or a varicose condition of the cord. The neighbouring parts are intact. The lesion may remain stationary—at least, apparently so—for months, and even for years, when it becomes surrounded by an œdematous tumefaction, which gradually invades the ventricular bands and the arytenoid region, and soon afterwards the cord becomes immobilized in the middle line. At the stage, where laryngeal cancer presents

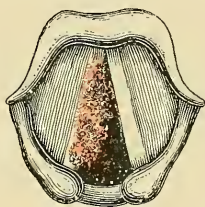


FIG. 187.—EARLY EPITHELIAL CANCER OF THE RIGHT VOCAL CORD.

its usual classical appearance, this morbid degeneration varies according to its anatomico-pathological constitution.

**Epithelioma.**—This variety of cancer is by far the most frequent, and has the appearance of a reddish, mammillated, anfractuous tumour, with granular, ulcerated edges, covered with cauliflower-like masses of a sanious appearance. The tissue appears, as if sprinkled over with very fine sand. At other times the lesion is accompanied by mere cancerous infiltration, with rugose appearance, and is characteristically surrounded by œdema. Later on peripheral infiltration is considerable; the organ is deformed, becomes ulcerated and covered with greyish, blackish, sanious detritus. It bleeds very readily.

**Encephaloid.**—The swelling is more uniform, is slightly mammillated, and covered with buds, which are sanious,

greyish, and sphacelated here and there. Ulceration occurs early, and mushroom-like granulations with large peduncles develop at its surface. The neoplasm is generally extralaryngeal.

**Sarcoma.**—Sarcoma seems to be less frequent than epithelioma. It is sometimes inserted by a broad base on the epiglottis, or on its folds, or on the mucosa of the cords. Occasionally it is almost pedunculated, and appears as a large verrucose tumour of red or yellowish hue, made up of small isolated, readily-bleeding projections. Those tumours may attain to an enormous bulk (hen's egg), and be projected into the mouth during the act of expectoration. The author has seen those neoplasms become sphacelated through local

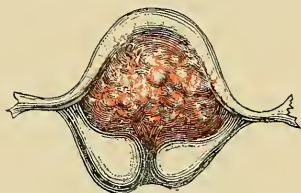


FIG. 188.—SARCOMA OF THE LARYNGEAL SURFACE OF THE EPIGLOTTIS.  
(FROM NATURE.)

infection (diphtheria, influenza), and be partly expectorated in an effort of vomiting. Microscopic examination alone permits recognition of the varieties of sarcoma.

**Melanitic Tumours.**—Those are exceptionally rare (two cases are noted by Sir Morell Mackenzie), and are recognizable by a sanious, blackish, generally characteristic appearance.

**Site.**—The parts of the larynx most frequently affected by malignant tumours are the ventricular bands and the vocal cords (endolaryngeal cancers) and the arytenoid region (extralaryngeal). External modifications of the larynx and the neck only appear, when diagnosis is already clear to a skilled observer. In the case of an endolaryngeal cancer it is, when the tumour is ulcerated, and the above symptoms are at an advanced stage, that the thyroid becomes hypertrophied and carapace-like in form (Isambert). The

thickened cartilage then forms in front and on the sides of the larynx, as it were, a shield, characteristic of the neoplastic infiltration, which generally invades it from within outwards. The neck becomes swollen, as glandular involvement also appears, forming with the tumefied larynx a hard 'wooden' and immobile mass.

When the tumour is extralaryngeal, the characteristic adenopathy (the deep glands, hardened *en masse*, painful and adherent to the deeper structures) appears early, and occupies the side, on which the degeneration has originated, or even both sides of the submaxillary or the carotid region.

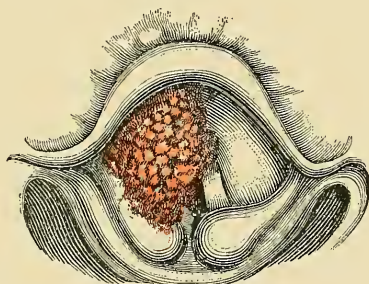


FIG. 189.—EPITHELIOMA OF THE RIGHT VENTRICULAR BAND.

According to the site of the cancer, adenopathy often occurs at the angle of the jaw, slightly below the parotid gland. At this stage the larynx is almost entirely immobilized; the whole region of the neck is hard, 'wooden,' painful to the touch, and shows protuberances. Softening of the glandular mass may occur, with abscess formation, from which an ichorous, sanious liquid escapes. The surface of the broken-down gland is covered with greyish buds, forming at its surface a mushroom-shaped neoplasm.

An important symptom, which is seldom absent in cancer of the posterior region, is the loss of laryngeal crepitation. When the larynx in the normal state is moved laterally, a characteristic crepitus is perceived. This disappears on one or both sides as soon as the fibro-cartilage (cricoid) becomes infiltrated.

*Pathological Anatomy.*—Malignant tumours of the larynx do not differ from those of other organs. The only fact to point out here is, that diagnosis of cancer is not always easily settled at the outset, and that microscopic examination of several portions removed by the forceps should be made.

*Course—Duration.*—The course of the affection varies according to the nature of the neoplasm and the age of the patient. Extralaryngeal cancers being more liable to irritation (passage of the bolus, movements of deglutition), have a more rapid course than those situate inside the larynx. Thus malignant tumours originating on the vocal cords of elderly subjects develop slowly, and may remain as if stationary for years, causing no other functional disturbance than huskiness.

When, on the other hand, the neoplasm, under the influence of local irritation or any other cause, has begun to extend, and *a fortiori*, when ulceration and budding have appeared, the disease then progresses rather rapidly. After respiratory disturbances have rendered tracheotomy necessary, death usually ensues within one or two years. Thyroid perichondritis and glandular involvement also occur, indicating the diffusion of the neoplasm, and ushering in the cachectic stage.

*Termination—Prognosis.*—Cancer of the larynx is a very grave affection, and incurable if left alone. The patient dies either from asphyxia or from inanition or cachexia. Asphyxia results not only from the obstruction of the air tract (bulk of the neoplasm, infiltration of the neighbouring parts, immobilization of the arytenoids), but also from the compression of the recurrensts and even of the pneumogastriks. The neoplasm involves the whole region of the neck (œsophagus included), causing respiratory and circulatory embarrassment. Death usually occurs from bulbar syncope, and that in spite of the tracheal canula, and of the free penetration of air into the still unaffected portion of the trachea.

The infiltration of the peritracheal glands and their degeneration may also cause respiratory stenosis by com-

pression of the trachea and of the first divisions of the bronchi.

At this stage the larynx is entirely immobilized in the midst of diseased tissues, a condition which renders alimen-  
tation difficult and painful.

Certain sarcomata and pavedmented epitheliomata situated on a cord, if treated before the infiltration stage, seem to be less malignant.

*Complications.*—In the case of an endolaryngeal cancer, after tracheotomy has been performed, the neoplasm may extend to the trachea below the opening, and cause asphyxia.

Hæmorrhage is also a dangerous complication, as it is difficult to combat.

*Diagnosis.*—Diagnosis is easy in some cases, especially at the stage of confirmation, but at the beginning it presents

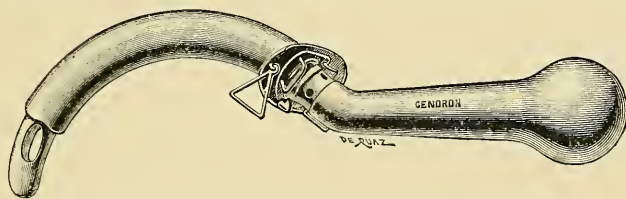


FIG. 190.—CANULA FOR TRACHEOTOMY, WITH PEAN'S PILOT.

certain difficulties. It does not seem necessary to describe the differential diagnosis between polypi of the larynx and cancer. Certain horny papillomata with a broad base, observed in old people, might perhaps give rise to suspicion, but those tumours are rare; and, besides, histological examination would remove all doubt. The existence of peripheral infiltration, and especially the immobility of a vocal cord, would point to a malignant degeneration.

Laryngeal tuberculosis is seldom limited to one cord; as a rule, the lesions are more superficial; the buds, if present, are paler, more diffuse, and are in the pseudo-polypoidal form. The interarytenoid region exhibits the usual characters of bacillary infection.

Laryngeal lupus, having a marked predilection for the epiglottis, exhibits pale, rosy granulations, destroying the under-



lying tissues, and cannot be confused with malignant tumours, except for a very short time at the very beginning.

In some very rare cases, however, where the lupoid lesion is so well limited to the operculum, especially if the patient is old or otherwise healthy, histological examination alone can dispel all doubts. Lupus is painless, whereas cancer is usually painful, spontaneously or otherwise.

Syphilis during the secondary stage presents no analogy with cancer, but in the tertiary stage it is difficult sometimes to be certain of the diagnosis. It should be kept in mind, that gummata generally have their seat on the epiglottis, one of the ventricular bands, the ventricular mucosa, or the subglottic region.

The evolution of the affection should be taken into account, besides its history. Gumma produces within two or three months first vocal, then respiratory disturbances, if specific treatment has not been applied. The course of cancer, on the contrary, is much slower; moreover, the localization is different.

The gumma appears as a diffuse infiltration, red, it is true, but without protuberances or hypersecretion. Neither spontaneous pain nor blood-streaked expectoration is present. At the stage of ulceration the syphilitic loss of substance is crateriform, serpiginous, and deeply penetrates into the tissues; its surface is greyish and dirty, suppurative, and is accompanied by reddish budding, peripheral infiltration, sometimes with perichondritis. In spite of extensive lesions, the vocal cords often remain mobile. Finally, the ulcer spreads upwards, gradually reaching the base of the tongue, the tonsils and the lateral walls of the pharynx deforming and destroying the affected parts.

Tertiary manifestations are often found on the soft palate, the palatine vault, or in the naso-pharynx, and diagnosis is thereby facilitated.

Finally, all doubt is dispelled by specific treatment, which is rapidly efficacious in syphilis (a week or even two days), whereas in cancer its effects are usually absent, or at least very slight and transitory.

Hybrid forms sometimes occur. In those cases diffuse,

suppurating, crateriform ulceration, with a dirty and greyish base, should be attributed to syphilis, whereas cancer accounts for the sanious, fetid buddings, accompanied by reddish, hardened infiltrations.

The existence of spontaneous and neuralgic pains, accompanied with bloody expectoration, suggests malignant tumour. In this case specific treatment cures the syphilitic infection, but the neoplasm follows its slow and progressive evolution.

In those hybrid forms, which usually develop outside the larynx, it is not unusual to observe an extensive adenopathy,

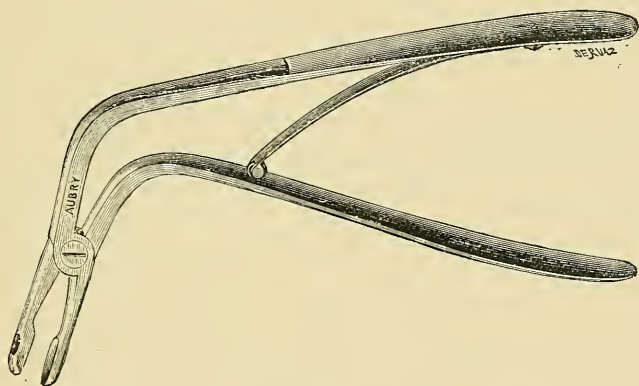


FIG. 191.—RUAULT'S PUNCH FORCEPS.

irregular on its surface, adherent, 'wooden,' and painful to the touch.

*Treatment.*—Some authors still advise abstention from operation, or tracheotomy as a palliative remedy, when asphyxia is threatening. Others, on the contrary, favour more radical operations, such as removal of the tumour by the external method, partial or even total extirpation of the larynx.

Painting with tincture of thuja or of celandine, or with their extracts, or even with solution of adrenalin (1:1,000), may check the budding, but they do not in any way arrest the progress of the tumour.

The efficiency of the X rays and of radium is not yet adequately worked out.

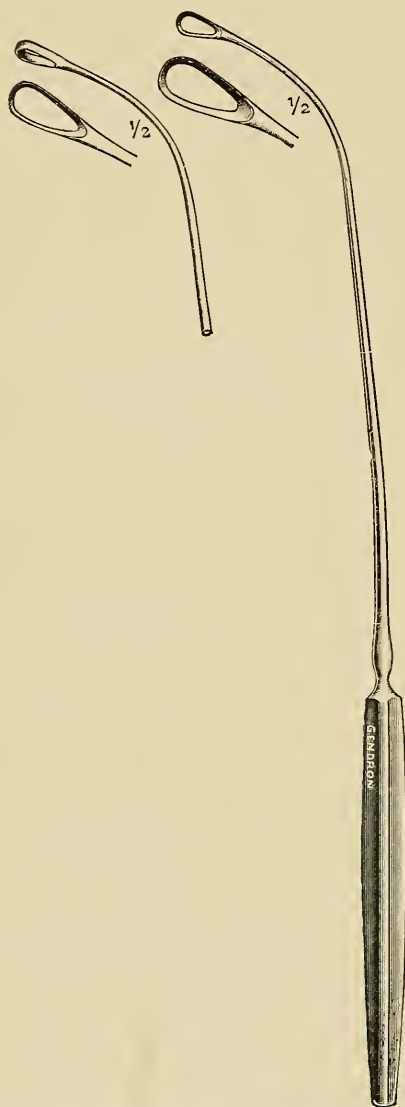


FIG. 192.—LARYNGEAL CURETTES MOUNTED ON SEPARATE HANDLES.

(a) *Natural Tract*.—A few authors are still in favour of extraction through the mouth. Although this method has given good results in exceptional cases (very limited neoplasms), it should not be generally employed. The cancer not only recurs, but also assumes an acute course, and it is unfortunately, as yet, impossible to determine which tumours are susceptible of cure by this method. For that reason the author thinks, that the endolaryngeal method should be employed only to confirm diagnosis.

(b) *Tracheotomy*.—The diagnosis of laryngeal cancer is generally made too late. The patient seeks for advice when he experiences difficulty in breathing—*i.e.*, at the stage of infiltration. Hence some authors hesitate to perform a radical operation, and advise tracheotomy, to prevent immediate death.

In cases of intralaryngeal neoplasms the opening of the trachea, practised at this stage, protracts the life of the patient for from eighteen

months to two years. On the contrary, if the tumour is extralaryngeal, tracheotomy does not prolong life much; the patient dies, if not from asphyxia, from inanition and cachexia.

In certain advanced cases the extension of the lesion renders removal of the affected parts almost impossible, and some operators prefer to practise tracheotomy, when this becomes imperative. The latter operation should then be made as low down as possible, in order to avoid the tumour, and to prevent the buds from reaching, later on, the tracheal tube.

It is well to recall that tracheotomy in cancerous people is very different to that carried out in the case of children. In adults, the bloodvessels are large, the veins much dilated, the tracheal tube deeply situated; the neck may be short,

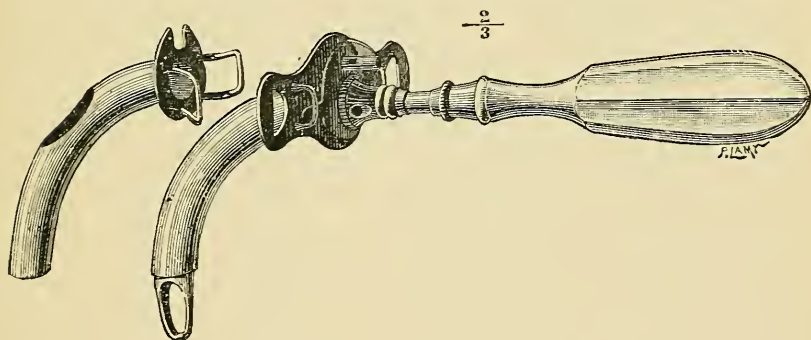


FIG. 193.—TUBULAR CANULÆ, WITH PEAN'S HANDLE.

thickened, and sometimes infiltrated—all conditions which make the operator careful not to take any regrettable risk. *The operator should therefore proceed slowly layer by layer, ligaturing the vessels with catgut before opening the air duct.*

The trachea, once laid bare and under good illumination, should be incised, as usual, with a straight, rather short, and well-sharpened bistoury. Care must be taken, that the inferior part of the incision should be under observation all the time, and that no bloodvessel is divided, and left bleeding, as hæmorrhage is then always serious.

The trachea should be opened under full inspection; the lips of the incision (pretracheal tissues) should be held apart by two special retractors, and the forcipressure forceps may

be used to clamp the two ends of the divided thyroid body. That being accomplished, the canula is introduced by the assistance of Pean's or Krishaber's instrument, which has the enormous advantage of dispensing with the dilator, an instrument responsible for many mistakes in the hands of young and anxious surgeons during the introduction of the canula.

It is important, during the introduction of the canula, that the patient's head should be kept strongly bent back, as it was during the operation, and frequently it is of advantage to

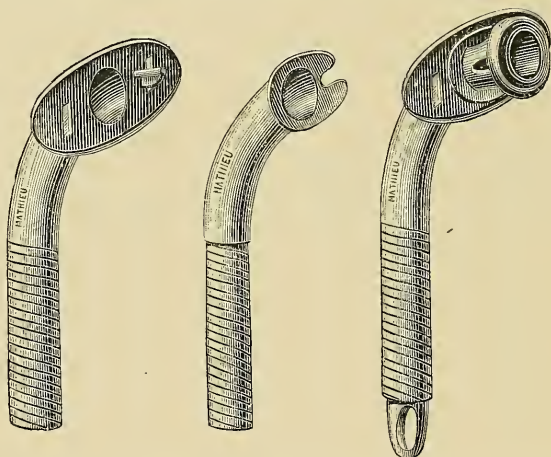


FIG. 194.—TRACHEOTOMY CANULÆ, WITH FLEXIBLE TUBES.

maintain the trachea steady and raised up with the assistance of a tenaculum fixed under the cricoid ring. In this way a clean and well-defined incision is obtained.

The canula being once in place, the wound should be dressed aseptically, and a layer of warm, dry gauze applied in front of the neck to filter the air which enters the lungs. If desirable, a few sutures may be used to bring the edges together, but it should be remembered that it is desirable to leave the wound open above the canula and so avoid subsequent emphysema.

The operation is performed under chloroform or after a simple subcutaneous injection of cocaine. The former



method is to be preferred when the respiration is still good and there is no danger of asphyxia. The latter is indicated when the tumour is large and respiratory disturbance considerable. In some cases, where the patient cannot remain lying on account of respiratory stenosis, he should be operated on sitting in an armchair, his head being bent backwards. This position is favourable for operations.

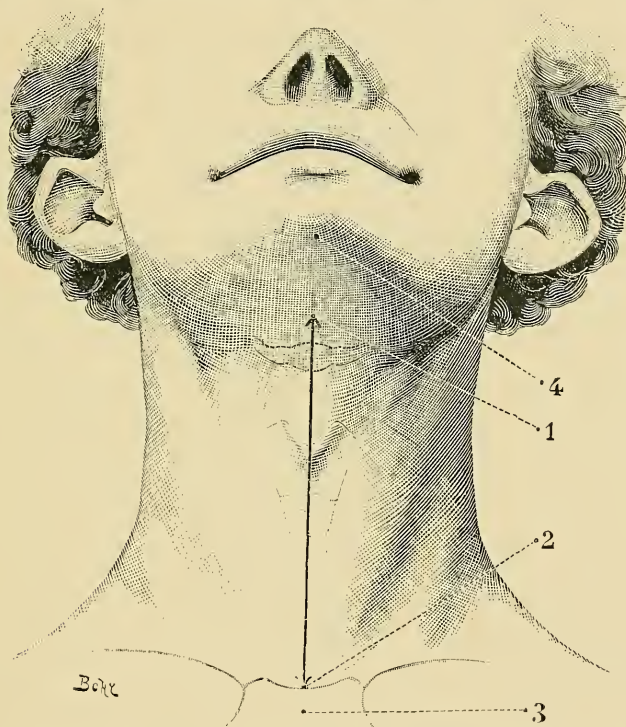


FIG. 195.—LINE OF CUTANEOUS INCISION IN MEDIAN THYROTOMY.  
1, Hyoid bone; 2, sternal notch; 3, sternum; 4, mental symphysis.

When diagnosis is made early, the radical operation is called for, which, according to the case, consists in opening or in partial or total extirpation of the larynx.

(c) *Thyrotomy (Laryngo-fissure).*—This method should be exclusively reserved for cases where the tumour is inside the larynx, and particularly for neoplasms seated on one of the

vocal cords. Tumours recognized before any infiltration has developed, or the corresponding arytenoid is immobilized, alone have chances of favourable results from operation.

The opening of the larynx may be regarded as a benign operation, and not endangering the life of the patient, if

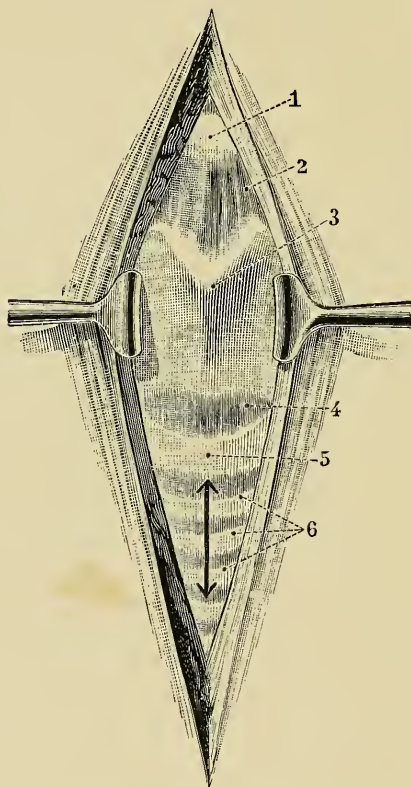


FIG. 196.—SECOND STAGE OF THYROTOMY.

1, Hyoid bone ; 2, thyro-hyoid membrane ; 3, thyroid cartilage ; 4, crico-thyroid membrane ; 5, cricoid ; 6, line of tracheal incision.

performed according to Semon's rules, on which the author has made important modifications.

The volume of the tumour being small enough not to interfere with respiration, the patient is put under chloroform. He is then placed on an inclined plane, so as to avoid the flow of blood into the air tract. Sometimes it

is sufficient to tense the neck backwards, the chin being kept raised by an assistant holding an aseptic compress. The field of operation having been sterilized, an incision is made from the hyoid bone extending almost down to the sternal notch, and as much as possible in the middle line. The operator should avoid making an oblique incision, and, to secure that end, the assistant who holds the head should place his index-finger on the maxillary symphysis, while the other has his at the sternal notch. The skin should be stretched vertically, but not laterally.

Beneath the skin and the superficial aponeurosis there are usually met with in the upper part the projection of the thyroid cartilage (*pomum Adami*), and then the thyro-hyoid membrane, whereas in the inferior part, if exactly in the middle line, is seen the muscular interspace, through which the bistoury is passed. At this level the thyroid veins appear, and often the arteries (transverse and vertical), which are necessarily divided, and which should be ligated before the air tract is opened. The thyroid body, situate below, should always be resected medially. Bleeding, abundant at first, is quickly stopped by direct compression and by ligature of the important vessels. The operation field being perfectly bloodless and the lips of the wound being held apart, the whole laryngeal duct may be seen.

Before opening the trachea, it is well to expose partially the blades of the thyroid cartilage and to lay bare the thyro-hyoid and crico-thyroid membranes, so as to lay free the portion of the larynx to be incised. Hæmostasis being complete and the bloodvessels ligatured, tracheotomy is then performed below the first or second ring of the trachea. This operation should be made between two retractors slowly and smoothly. As one is more or less familiar with this operation, a Trendelenburg or Hahn's canula is used, or even an ordinary one. The patient, being partially awakened, may then expel during the efforts of cough, which accompany the introduction of the canula, the blood or secretions which may have fallen into the aerial tract. After the first spasms are over, and when the trachea is perfectly free from blood, the

patient is again anæsthetized through the canular opening. If Trendelenburg's canula is used, it is inflated. If Hahn's canula is used, we must wait for about ten minutes for the sponge surrounding it to become dilated.

This generally causes a fit of coughing, owing to the pressure of the indiarubber or sponge on the walls of the trachea. It is prudent in patients with a narrow tracheal duct to dilate the trachea moderately; otherwise there might occur an alarming syncopal condition, with arrest of respiration. Those complications are not to be feared with an ordinary canula. Chloroform should be administered at a distance with a special apparatus (see Fig. 197) and carefully, as the patient absorbs it readily. Besides, operations on the larynx are liable to cause syncope. Finally, it is important that the patient from time to time recovers a part of his tracheal reflexes, in order that he may expel blood or mucus from his trachea. By this method the operator knows what is going on in the air-duct, and he is able to prevent immediate or ulterior complications (broncho-pneumonia).

If an ordinary canula is used, the crico-thyroid membrane, in the first place, should be incised from above downwards, throughout its whole length, in the middle line, and then a strip of gauze soaked in the following solution introduced:

R Hydrochloride of adrenalin

(1 : 1,000) ... ..	15 to 25 drops	℥xv to xxv
Hydrochloride of cocaine	1 gramme	gr. 15
Distilled water ... ..	10 grammes	ʒiiss

This will serve as a tampon in the cricoid ring. The practitioner then, introducing through the opening of the membrane the blade of the curved scissors devised for that purpose from below upwards, incises at one stroke the fibro-cartilage between the two cords. He places a retractor on each side between the blades of the cartilage, and then introduces into the larynx a strip of gauze soaked in the above solution, which also serves to induce hæmostasis. If the thyro-hyoid membrane is not sufficiently incised to permit complete inspection of the larynx, the incision should

be enlarged vertically with scissors. It frequently happens, that the incision apparently made medially is not exactly on the medial line. A semi-detached fragment of mucosa is then seen hanging in the larynx and obstructing inspection. The patient bleeds and struggles, and accordingly the bridle must be rapidly cut to admit plugging being performed, as indicated above.

The most delicate part of the operation is the exact medial incision of the thyroid. This must be performed in one movement to enable the blades of the cartilage to be quickly separated, and rapidly ensure hæmostasis. The cricoid should not be touched. Shortly afterwards two retractors are inserted in the thyroid, and the cartilaginous

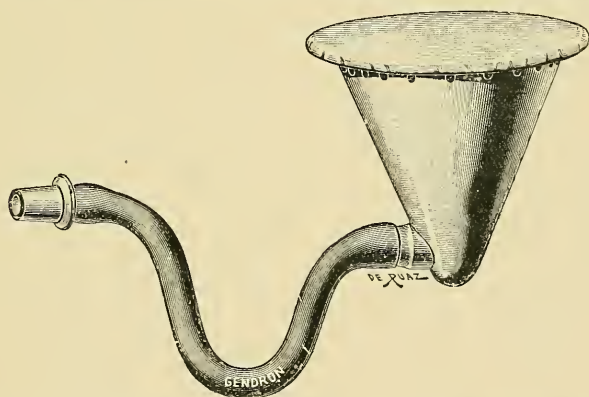


FIG. 197.—VESSEL FOR ADMINISTERING CHLOROFORM THROUGH THE CANULA.

valves are gently pulled apart, like the leaves of a book, enabling the interior of the larynx to be seen.

The tumour then usually appears larger and the insertion greater than was shown by the laryngoscopic mirror (Semon). Before dealing with the tumour a small plug of sterilized gauze, prepared beforehand, should be inserted into the ring of the cricoid or the inferior part of the opening. It should be of the same calibre as the trachea, and be forcibly stuffed *above the canula* and held by a silk thread. This inferior plug replaces the cocainized strip of gauze introduced on the incision of the crico-thyroid mem-



brane, and is intended to prevent the penetration of blood into the deep air tract. This method dispenses with the use of Trendelenburg's canula or its substitutes.

A similar plug may be placed advantageously superiorly behind the epiglottis to prevent the saliva interfering with the curetting of the larynx.

Removal of the tumour should then be made with the

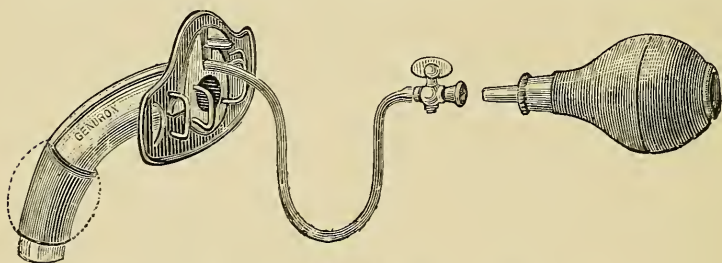


FIG. 198.—TRENDLENBURG'S CANULA.

The dotted lines represent the rubber portion when swollen.

cutting forceps, curved scissors, various curettes, bistoury, etc. The base should be cauterized in excess of the limits of the tumour with a thermo-cautery.

Once bleeding is completely arrested, the blades of the thyroid cartilage should be approximated as close as possible, and maintained in that position with catgut.

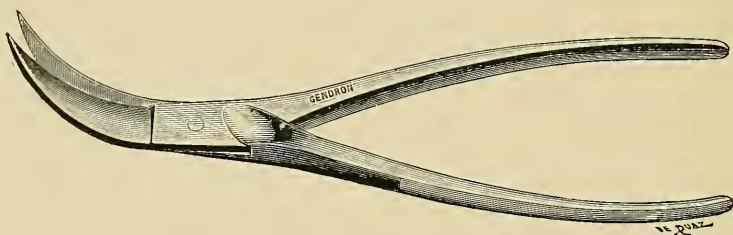


FIG. 199.—CURVED SCISSORS FOR CUTTING THE THYROID CARTILAGE.  
(MOURE.)

The prelaryngeal tissues should be gradually reunited layer by layer, the muscles being sutured with gut and the skin with horsehair.

Till lately the operation was then ended, a plugged or ordinary canula being left *in situ* for several days to prevent

respiratory disturbance due to post-operative inflammatory œdema. However, a laryngoscopic examination made on

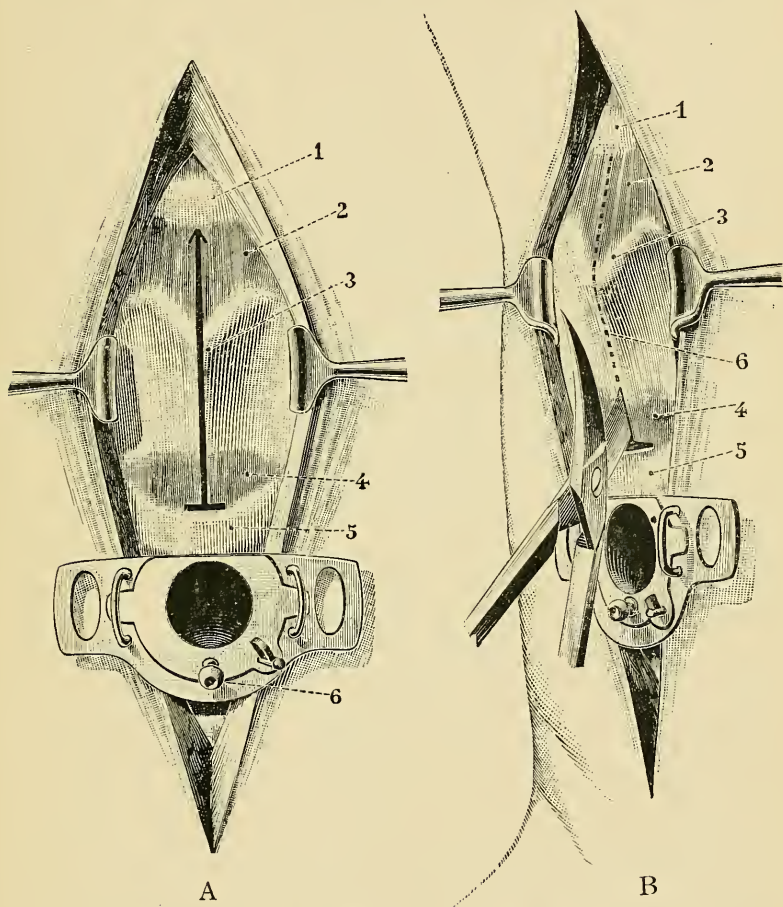


FIG. 200.—THE CANULA HAS BEEN PUT IN PLACE; THE BLACK STROKE INDICATES THE LINE OF THE THYROID INCISION. IN FIG. B THE CURVED SCISSORS FOR MAKING THE SECTION ARE ALREADY PLACED IN THE CRICO-THYROID MEMBRANE, WHICH HAS BEEN CUT.

1, Hyoid bone; 2, thyroid membrane; 3, thyroid cartilage (projecting angle); 4, crico-thyroid membrane; 5, cricoid; 6 (Fig. A), vessel for inflating the rubber portion of the canula; 7 (Fig. B), line of the thyroid incision.

the same evening or the day after has enabled the author to verify that the laryngeal orifice was still adequate to permit

of the entrance of air into the air tract, and he has practised in his later operations *complete suture of the laryngo-tracheal tract from above downwards*.

The author, from motives of prudence, has nevertheless left at the inferior part of the wound at the level of the tracheal opening a small unsutured wound of the skin and subjacent tissue, to avoid emphysema, which is apt to occur during vomiting, or from cough following operation. The patient should be placed under supervision for forty-eight hours, and the canula rapidly replaced if respiratory disturbances endanger life.

It must be recollected that the removal of the tumour, on the one hand, with tearing of the laryngeal mucosa and thermo-cauterization on the other, not only produce peripheral œdematous infiltration, but also the formation of

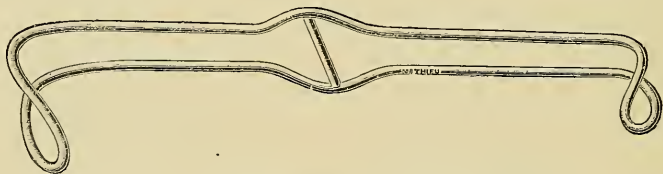


FIG. 201.—STEEL RETRACTOR (NICKEL-PLATED).

a pseudo-membranous layer, and sometimes contraction of the opposite cord, thereby producing respiratory stenosis. The latter, however, never necessitates the replacing of the canula.

This method hastens cure and avoids broncho-pulmonary complications.

The author thinks, that transverse laryngotomy, either above or below the hyoid, does not allow free access.

It offers no advantage over medial section of the thyroid. He is of opinion, that abstention from tracheotomy is dangerous, as it is difficult during an operation on a bleeding larynx to chloroform the patient by that route, when penetration of blood into the air tract cannot be prevented; and that is a grave accident.

(d) *Partial or Total Extirpation of the Larynx*.—This method has lately given encouraging results.

If during thyrotomy a malignant degeneration of the thyroid

cartilage is observed—*e.g.*, of one of the blades or a portion of it—the affected region should be resected beyond its limits, and if need be hemilaryngectomy performed. An attempt should then be made to reconstitute a laryngeal channel, either

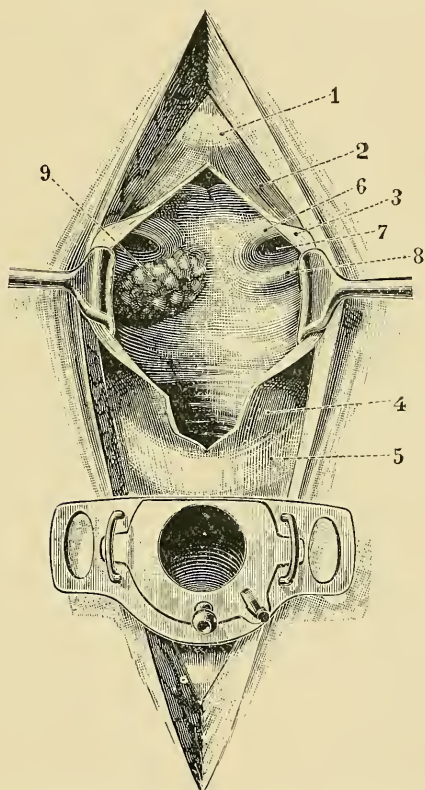


FIG. 202.—LAST STAGE OF THE OPERATION; THE LARYNX IS OPENED, AND THE THYROID VALVES KEPT APART.

- 1, Hyoid bone; 2, thyro-hyoid membrane, partly cut and held apart;  
 3, thyroid valve folded over; 4, covered crico-thyroid membrane;  
 5, cricoid; 6, left ventricular band held open; 7, ventricle of Morgagni;  
 8, left vocal cord; 9, tumour inserted on the right vocal cord.

by suturing the remaining portions of the thyroid, or if half of the organ has been removed, by letting the wound cicatrize. As a general rule, the remaining side of the larynx continues to act as before, while the other is replaced by a cicatricial fibrous tissue.

The author has had the opportunity of seeing the tracheal canula dispensed with some time afterwards, the patient being able to breathe by the new cicatricial channel. At any time if respiratory embarrassment takes place, it is easy by the help of a dilator to keep the wound open.

If the whole of the thyroid is invaded, intervention is open to discussion, not because of the operation, but of its unsatisfactory results, as most cases prove fatal within two or three years—some from recurrences, others from intercurrent affections (broncho-pneumonia, cerebral hæmorrhage, etc.). This mortality may be attributed to the unfavourable conditions of operation, for the neoplasm may not only have invaded the larynx, but also the neighbouring parts (œsophagus, base of the tongue, etc.), often even the glands of the region. The operation, to have any real chance of success, should be performed when the tumour is still encapsuled in the larynx. Once the operation is decided on and accepted by the patient, the best method of procedure is manifestly that recommended by Périer, which consists in making in front of the neck a T-shaped incision—one cut being in the middle line, as in thyrotomy, the other transverse over the hyoid. Those incisions should penetrate to the laryngeal cartilage. The larynx being then regarded as a true tumour, its external surface must be laid bare by reflecting the muscles to the level of the inferior constrictors of the pharynx. The larynx thus freed is only connected posteriorly with the pharyngo-œsophageal mucosa, and below with the trachea, which has not yet been opened. The trachea should then be detached from the œsophagus by means of the grooved director and the finger; a thread passed through the trachea to draw the latter forward is very useful.

Bleeding having been arrested during the operation, the first tracheal ring below the cricoid cartilage is now cut, and the tracheal tube drawn forward, so as to introduce internally a special canula of large calibre. The administration of chloroform is now continued through the external orifice of the canula, while extirpation of the larynx is being completed. The larynx should be separated posteriorly from the



pharyngeal mucosa, and laterally from the great cornua of the hyoid bone, and, if need be, from the epiglottis at its base, should it be necessary to remove the operculum. The operation is finished by suturing the opened tracheal ring

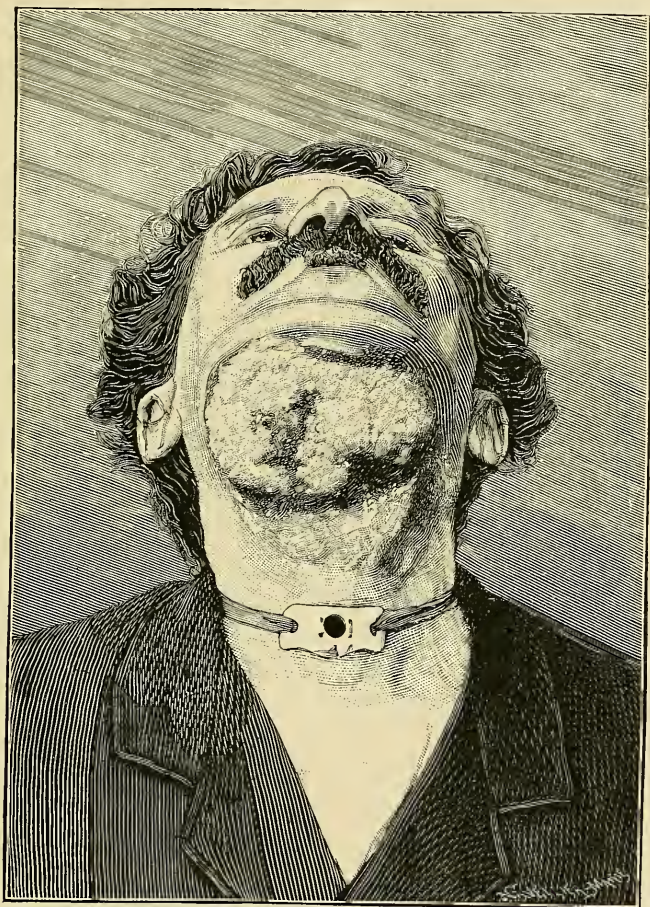


FIG. 203.—APPEARANCE OF A PATIENT AFFECTED WITH CANCEROUS RELAPSE AFTER EXTIRPATION OF THE LARYNX. (DRAWN FROM NATURE.)

to the inferior part of the wound, in order to bring it completely to the surface of the neck. Great care must be taken to leave in the trachea a canula to ensure respiration.

The larynx being removed, an œsophageal tube is placed

in the stomach, introduced through one of the nostrils, and an attempt is then made to suture the anterior wall of the œsophagus to the inferior portion of the thyro-hyoid membrane, or, if the hyoid bone has been removed, to the inferior portion of the wound with the base of the tongue. This procedure has the advantage of completely separating the laryngeal wound from the buccal cavity, and consequently of protecting it from secondary infection. Complete union of the wound situate above the canula can be brought about by merely introducing a drain, in order to facilitate the escape of fluids that are formed almost always after the operation, and also to prevent the secondary infection, which may supervene by the very rapid destruction of the sutures which bind the œsophagus to the floor of the mouth.

This method has the sole inconvenience of preventing laryngeal prothesis, but we know unfortunately that the latter has not given good results. Moreover, Dr. Gluck, of Berlin, spoke very favourably at the International Congress of Medicine at Paris in 1900 of a means of rhino-tracheal prothesis, which enables the patient to speak in a loud tone. He obtained this result by placing a phonatory tube in the tracheal orifice and another in the patient's nose, and successfully utilized this apparatus, in spite of the absence of communication between the trachea and the mouth.

In cases where the operation is performed during the stage of asphyxia, when laryngeal stenosis is complete, and when tracheotomy is compulsory, or when the patient already wears a canula, the operative conditions are somewhat different.

It is expedient, after having made the preceding T-shaped incision on the skin and tissues of the neck, so as to lay bare the organ, to detach at first the larynx laterally, carefully avoiding the introduction of blood into the air tract. For that purpose Trendelenburg's canula is often necessary. This requires careful attention. As soon as the larynx is almost free, the tracheal end should be rapidly cut, and the operation proceed on the lines referred to above.

Occasionally a wide fistula may remain in front of the neck in place of the larynx, communicating freely with the

base of the tongue and the pharynx. To close this fistula, Dr. Gluck has designed an autoplasmic operation, which the author has seen employed by him with good results. It consists in making on the anterior portion of the neck two cutaneous flaps, by means of two parallel transverse

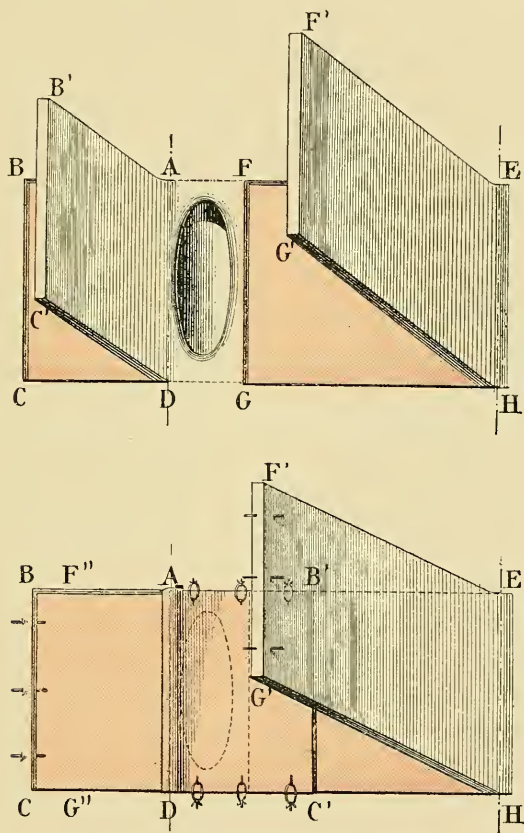


FIG. 204.

incisions on the same horizontal plane, ABCD and EFGH, which pivot, the first round the axis AD, and the second round the axis EH. The flap EFGH, the greater, is raised; while the flap ABCD, the smaller, is turned over on itself, the axis AD remaining fixed, the side BC joining at B'C', where it is attached, the cutaneous surface being turned backwards.

The raw surface, AB'C'D, is covered partly by the raw surface of the flap EFGH. The flap EFGH is then restored to its former position, and in consequence of the elasticity of the tissues, FG comes to occupy a position, F''G'', neighbouring to BC. By dissecting a little beyond this flap perfect union can be obtained, which may be maintained by suturing.

It follows from this autoplasty, that the space AFDG is covered with a double cutaneous surface, one facing the organs primarily removed, the other re-establishing the continuity of the cervical integuments.

The sole inconvenience of this method is, that the part of the skin turned back from the side of the pharynx is often covered with hair which grows at the base of the tongue. This necessitates epilation from time to time. However, when this epidermis has remained long enough in contact with the pharyngeal wall—a warm and humid medium—the epithelium becomes quickly modified, and resembles a rather thick mucous membrane.

#### FOREIGN BODIES IN THE LARYNX AND AIR TRACT.

Foreign bodies in the larynx and air tract are frequently seen. We may divide them into liquid and solid. In the first class are ordinary beverages, introduced into the air tract during deglutition, or blood from the lungs, the bronchi, or a tracheal wound. Solid bodies penetrate by the mouth, or externally after a traumatism (bullets, etc.).

The introduction of bodies by the natural tract may be the result of disturbances of sensibility, due to central lesions (old men, lunatics), or to peripheral paralysis (diphtheria).

The author cannot admit, that destruction or morbid conditions of the epiglottis are a frequent cause of the penetration of foreign bodies into the air tract, for he has seen patients not at all inconvenienced by the loss of the glottic operculum.

Foreign bodies may even penetrate into the larynx or the trachea during the administration of chloroform or ether; accordingly, it is advisable to examine the mouth before administering an anæsthetic. Most frequently this accident occurs unexpectedly. During a fit of laughter, or in conse-



quence of a fright, a short, deep inspiration draws the foreign body from the buccal cavity into the air tract. The same may happen during sleep, when children or adults have gone to bed with an object in their mouth.

In countries where vulcanized or gutta-percha canulæ are used, it sometimes happens that after tracheotomy fragments of these latter become detached, and penetrate into the trachea or one of the bronchi.

During deglutition sharp bodies are often arrested at the entrance of the larynx (needles, pins, etc.).

Finally, foreign bodies may come from the œsophagus through ulceration of its walls, or from suppuration of a bronchial gland. Similarly, an object introduced into the

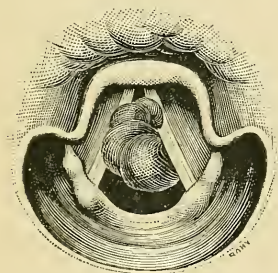


FIG. 205. — LEECH ATTACHED TO THE LEFT VOCAL CORD.

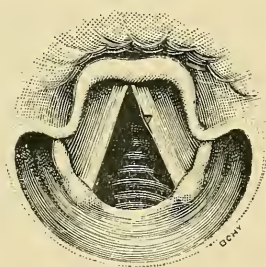


FIG. 206. — SAME LARYNX AFTER THE EXTRACTION OF THE LEECH.

nasal fossæ or the back of the nose may fall into the larynx during a movement of inspiration, or be carelessly pushed down by the hand of the surgeon. In hot countries leeches are occasionally seen in the larynx where the individual, being thirsty, has drunk greedily from a stream.

Solis-Cohen has recorded the fact of patients having swallowed their epiglottis. The author himself has seen a fatal case of that. In this way Rühle explains several sudden deaths occurring at table. Fletcher-Ingalls has recorded in 1881 the case of a patient who had swallowed his tongue. These cases are, however, rare enough to be quoted only as curiosities.

*Symptoms.*—The symptoms caused by the presence of foreign bodies in the air tract vary according to their bulk,



form, and position. If the dimensions are large enough completely and suddenly to obstruct the larynx, death may be immediate. These instances are common in asylums among old men and lunatics.

Oblong and smooth bodies more easily penetrate, and may become enclosed in the ventricle of Morgagni, remain between the two cords, or even descend into the trachea as far as its bifurcation. If they penetrate further, they usually lie in the right bronchus.

The first symptom of a foreign body in the air passages is a fit of convulsive, spasmodic, very violent, and almost characteristic cough. Gradually this fit abates during a lapse

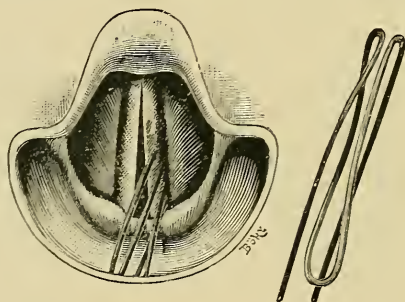


FIG. 207.—BENT HAIRPIN STUCK IN THE LEFT VENTRICLE, AND REMOVED BY THE NATURAL TRACT.

of time, varying with the position of the object and its volume, and according to the fixation of the foreign body in the air tract or to its mobility.

In the latter case an attack of convulsive coughing projects the body suddenly towards the cords, which close immediately to hinder its egress. It then produces a characteristic slapping sound. The intervals between each spasm vary, some patients having onsets twice or thrice daily, while others experience suffocative attacks, renewed on the least movement.

Pain is often absent. When it does exist, it is sometimes localized at the level of the larynx or around the cricoid.

The voice may be husky, bitonal, aphonic, and even

'choked,' according as the foreign body is situate in the subglottic region or between the vocal cords. Frequently the voice assumes a raucous and croup-like timbre.

Vocal disturbances are absent, when the body has penetrated below the larynx.

The characteristics of the cough are equally variable. It is usually convulsive, suffocative, and, like the voice, raucous and croup-like. The latter is, so to speak, characteristic, especially when accompanied by the valve-like sound, due to the impact of the foreign body on the glottic orifice, which is closed by the efforts of coughing. Very often a child is made to cough so that this symptom may be perceived.

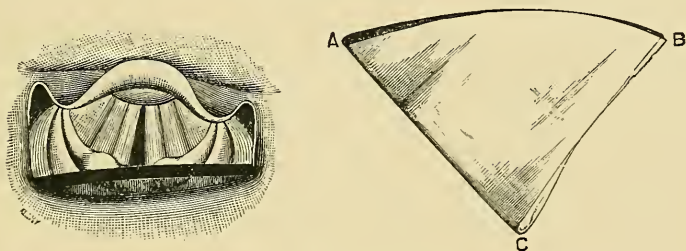


FIG. 208.—PIECE OF GLASS AT THE ENTRANCE TO THE LARYNX.

Appearance of the foreign body seen from above and after its extraction.

The expectoration may be mucoid, as in asthma. It is often muco-purulent, or even streaked with blood, if the foreign body has lodged for some time in the air passage, and caused irritation of the neighbouring parts. In the case of leeches, parasites, or living insects, the expectoration is bloody.

Generally speaking, percussion affords no indication, but it is often possible, on palpation of the anterior surface of the trachea, to feel the body move under the finger at the moment of coughing.

Auscultation assists diagnosis. Sounds produced by their movements and the flapping noise characteristic of mobile bodies are thereby perceptible, as well as evidences of a bronchial constriction or obstruction.

Direct examination is often inadequate. Nevertheless, if

the object is in the larynx, direct examination is the sole means of determining its nature, its form, and its size. If, however, it is situate below the larynx, examination is more difficult, and may prove negative in children, who are difficult to examine. In such cases the history of the above symptoms may often lead us to conclude, that the foreign body has passed below the larynx.

Radioscopy, or even radiography, may also be valuable in such circumstances. It is thus often possible to perceive a foreign body, even a seed, in the interior of the air tract, and consequently to determine its position. Direct tracheoscopy, after Killian's method, is also a valuable means for exploration and extraction.

The author thinks, that digital palpation is useless and often dangerous, as instead of being of assistance in recognizing a foreign body introduced into the upper air tract, it tends to make an object situate at the entrance of the larynx penetrate more deeply.

*Course.*—Foreign bodies are most frequently expelled spontaneously, as at the moment of their penetration into the air tract the vocal cords, contracting energetically, prevent their deeper ingress. Once introduced into the larynx or below it, they behave according to their form and nature. If they are sharp and pointed (needles), they can migrate across the tissues. Thus, certain sharp objects can traverse the thorax, and appear on the side of the chest or in other regions.

*Duration.*—The persistence of foreign bodies in the air tract, when death does not immediately follow their introduction, is variable. Certain seeds are liable to soften, be even dissolved and gradually eliminated with the tracheal or bronchial mucus. At other times suppuration occurs, detaching the foreign body, and facilitating its expulsion after a lapse of time. Sometimes it becomes fixed in the air tract, and remains for months and years.

In other cases, however, it finally causes death through sepsis. We have thus been able by autopsy of patients treated as tuberculous to find in the bronchi various foreign bodies.

Although patients have lived six, eight, or even ten years with foreign bodies in their air passages, it must, however, be confessed, that in general local infections are produced, which end sooner or later in death, either by suffocation or in consequence of acute or chronic pulmonary lesions, or of abscess of the neighbouring parts.

*Complications.*—The most frequent one is emphysema due to infiltration of air. The convulsive coughing favours the appearance of this complication. The purulent matter may produce asphyxia and septic complications, by penetrating into the mediastinum.

Tracheal ulceration is also observed, as well as ulceration of the larger bronchi, or caseous pneumonia simulating tuberculosis.

*Prognosis* varies according to the position of the offending body, its nature, its size, and the age of the patient.

*Diagnosis.*—The first point is to find out if the foreign body is actually present, as many patients come in the false belief that they have something in their larynx or trachea. When it exists, its nature and position must be determined. If the foreign body is lodged in the larynx, the laryngoscope indicates its presence, its form, its bulk, and its situation.

If, on the contrary, it has passed below the cords, and if, for some reason (intractability of the patient, peripheral inflammation, etc.), laryngoscopic and tracheoscopic examination are not applicable, recourse must be had to the history for information. This will show the abruptness of the attack, as in the case of a child playing with an object in its mouth and being seized with violent suffocation and impending asphyxia. These onsets are repeated in the night-time, according as the object is more or less bulky and movable. A comparative calm exists between the attacks, which often deceives the parents and sometimes the doctor. The cough is usually raucous, convulsive, suffocative, and is sometimes sonorous. The 'slapping sound' is present, and palpation over the anterior wall of the trachea reveals the presence of the foreign body.

Croup is readily recognized by direct inspection, or in any case by the laryngeal mirror.

Sometimes foreign bodies show none of the foregoing symptoms. Diagnosis is then difficult, if the patient or his friends have forgotten the possibility of the introduction of the body into the air tract.

The radioscope and the radiograph afford valuable information in cases of this kind.

*Treatment.*—An emetic or titillation of the pharyngeal cavity with a feather is prescribed, but those methods are unsatisfactory, and only serve to displace the body and produce a spasm of rapid asphyxia, or cause the body to penetrate deeper into the respiratory tract. It is for similar reasons dangerous to attempt extraction with the forceps alone or otherwise.

In a case of exigency the patient should be placed head downwards, or laid on an inclined plane, and sharp succussion applied. This method may succeed with heavy bodies.

Laryngeal reflexes and glottic spasms, preventing the egress of foreign bodies situate below the cords, may be avoided by chloroforming the patient.

Should those methods fail, recourse must be had to extraction, and here the methods of operation vary according to the nature of the body introduced and the depth at which it is situate. Extraction by the natural tract may be tried, if the body is at the laryngeal orifice, in the vestibular region, and the patient lends himself to laryngoscopic operation. Favourable results may be expected, except in the case of young children.

Owing to laryngoscopy, we can nowadays quote hundreds of bodies extracted by the mouth.

Bodies, whose nature and position have been determined beforehand, are readily removed by an experienced operator, the larynx being anæsthetized with cocaine (1 in 10), and he availing himself of the numerous modern laryngeal instruments.

If the foreign body in the air tract has penetrated deeply into the larynx, or if it is firmly embedded in the ventricles



of Morgagni or between the cords, the method of extraction varies according to the object. Extraction by the natural passages may be absolutely impossible, as the body may be firmly fixed and even embedded in the laryngeal walls. Extirpation by the external tract should in such cases be unhesitatingly practised by opening the thyroid cartilage mesially. At a pinch we might try extraction by simple incision of the crico-thyroid or thyro-hyoid mucosa, depending on the position of the foreign body; but it is clear, that thyrotomy (mesial laryngo-fissure) permits of a safer operation in the larynx, and even above and below that organ. Thyrotomy may be practised, according to the circumstances and the custom of the operator, with or without preliminary

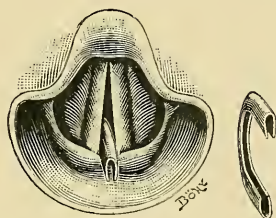


FIG. 209.—CORSET-LATCH EMBEDDED IN THE LARYNX,  
REMOVED BY THYROTOMY.

Appearance of the foreign body in the larynx and after its removal.

tracheotomy. Generally, and in children especially, the vertical and medial incisions of the thyroid cartilage and of the overlying tissues give rise to little hæmorrhage, and thus the tracheal tube need not be opened. However, if symptoms of asphyxia exist, tracheotomy should first be performed, then thyrotomy.

Once the foreign body is removed, the air tract and the pretracheal tissues should be sutured with catgut and the skin reunited with horsehair. A rapid cure ensues in a few days.

If the foreign body is situate below the larynx, the indication is generally more defined. Although some very skilled operators have removed *per vias naturales* foreign bodies from the trachea, and even from the bronchi, those cases

are exceptional, especially when the body is smooth and easily eludes the grasp of the forceps (kernel, seeds, etc.). In this case the trachea must be opened below the cricoid. The best method to obtain a clear operative field is to proceed slowly, making in the pretracheal tissues a long incision, laying bare the trachea for at least 2 or 3 centimetres. Before opening the air tract, the operator should ascertain that all bleeding has ceased, that the sensibility of the mucous membrane is not completely destroyed by narcosis, as tracheal reflexes may facilitate the expulsion of the foreign body. Immediately the trachea is opened, instead of placing in the opening the ordinary dilator, whose branches are thick and project into the incision, it is preferable to place on each side two blunt hooks, or two hairpins bent at their rounded end. These dilators introduced between the lips of the tracheal wound should be gently drawn apart so as to favour the egress of the foreign body, which is often expelled during the onset of coughing which follows the opening of the air tract. At other times the object may show itself at the orifice of the wound, then become aspired, and while being tossed rapidly upwards and downwards, it must be seized and fixed on the posterior wall before extraction can take place. These different manœuvres should be made with forceps, a blunt hook, a bent curette, or any other suitable instrument. The operation over, the author highly recommends immediate reunion of the tracheal tube, and also complete suturing of the lips of the wound with catgut; the pretracheal tissues should also be brought together with the same material and the skin with horsehair.

In cases where the foreign body cannot be expelled or extracted during the operation on account of its being deeply fixed towards the bronchial spur or in one of the bronchi, inspection can be made with Killian's tracheoscopic tube, and the object extracted by a special forceps.

If these manœuvres prove unsuccessful, the tracheal wound should be left open and a canula inserted, with a view to making other attempts on the same day or afterwards.

It is even possible (Killian) to explore for foreign bodies situate in a large bronchus, or even in a bronchus of the second or third division, by superior tracheoscopy and bronchoscopy performed during chloroform narcosis.

Finally, if the body is metallic, strong electro-magnets may extract it. To accomplish this the magnet should be placed before the tracheal opening, or a piece of curved magnetized iron be introduced by the orifice in the direction of the foreign body. This method is worthy of serious consideration. A metallic object deeply seated in the air tract may be detached thus through the thoracic wall, and the body be directed towards the large bronchi, or even the trachea, whence it may be easily extracted.

The author recommends the most prompt intervention that is possible for foreign bodies in the air tract, as they constitute a continual source of danger. It is always better to operate before complications appear.

### **Laryngitis associated with the Eruptive Fevers.**

Attention is not usually directed in practice to the larynx in eruptive fevers, unless respiratory stenosis is sufficiently pronounced. Affections of this organ are presumed, rather than confirmed, by direct examination. The author thinks this negligence is most reprehensible, as certain eruptive fevers leave after them grave and incurable disorders, which might have been prevented by proper treatment.

#### **RUBEOLAR LARYNGITIS.**

Functional disturbances are generally very slightly marked in the prodromal period, and merely consist of a slight huskiness or extreme harshness of the voice. Coughing assumes an acute dissonant timbre, especially when the eruption begins to appear. Attacks of suffocation and true stridulous laryngitis, probable consequences of peritracheal adenopathy during the eruption, are also observed. At this period respiratory disorders may be seen, due either to arytenoid or glottic infiltration, or to the more or less complete immobility of the crico-arytenoid articulations.

Dyspnœa may equally be the result of recurrent compression by peritracheal glands more or less swollen.

During convalescence the functional disturbances are almost the same as those of the eruptive stage, except that when the larynx is affected, the lesions are usually more important. True membranous laryngitis (croup) has been observed grafted on a primary catarrhal condition; nevertheless, this mode of termination of rubeolar laryngitis varies according to the epidemics. Gottstein formerly expressed the opinion, that measles provoked a predisposition to the localization of the diphtheritic processes in the larynx. Löri admits that the predisposition to croup in course of measles is hereditary, as he had noticed that children of the same family, having measles at distant intervals, were on each occasion attacked by this complication. In a similar way, with several years' interval, each member of a family succumbed to diphtheria consequent on this eruptive fever. However, other authors have not made analogous remarks.

*Laryngoscopic Examination.*—It is very rare in the prodromal stage to have the opportunity of examining the vocal mucosa, for parents believe that their children have merely caught cold, and seldom consult the doctor.

In rare cases, when the author examined the laryngeal mucosa, he has met with a slightly diffuse redness, with some disturbances of muscular asynergia, suggesting simple catarrhal laryngitis.

Laryngoscopic examination at the eruptive period shows the laryngeal mucous membrane uniformly red, and with a strong light it is even possible (Gerhardt) to see a reddish stippling, analogous to that seen on the pharyngeal cavity and the soft palate of children affected with measles. According to Gottstein, true papulæ appear. Sometimes those are thick and sufficiently confluent to form on the mucosa of the larynx elevated lines of a dark red colour, serpiginous, and covered here and there with small nodules.

In some rare cases small erosions are found either on the vocal cords, the ventricular mucosa, or the arytenoid

eminences, accompanied always by œdematous infiltration of the aryepiglottic folds and the arytenoid region.

When laryngitis supervenes during convalescence, a noticeable exudation is seen on the surface of the pharynx, the larynx, and the trachea, the mucosa assuming a velvety appearance, usually dark red, with small ecchymoses, erosions, and ulcers, and situated on the posterior portion of the vocal cords or the extremity of the cartilages of Santorini. The ulcer is of irregular form, with indented edges, surrounded by a more or less considerable zone of infiltration, according to its extent and depth. It originates in an alteration of the closed follicles of the laryngeal mucosa. In very rare cases abscesses of the ventricular bands or arytenoid eminences occur with œdema of the neighbouring parts.

On several occasions the author has observed the existence of subglottic infiltration, with partial immobility of the arytenoids in children affected with stridulant and stertorous breathing. This subglottic laryngitis appears to the author to be a frequent complication in certain epidemics.

Crico-arytenoid arthritis and pseudo-membranous laryngitis are easily diagnosed.

*Diagnosis* of the laryngeal disturbances of measles is easy, especially during the course of the disease. When the eruption has not appeared, the most we can do is to think of a simple stridulous laryngitis; but it is sufficient to recall that this affection supervenes in the night-time, while in rubeolar laryngitis the onsets are diurnal as well as nocturnal, and, besides, they are frequently continuous.

Hyperæmia of the conjunctiva and nasal catarrh, which are frequently the initial accompaniments of measles, and the existence of an epidemic, still are at this stage valuable indications in favour of this eruptive fever.

If croup complicates measles, it supervenes usually after the eruption or during the development of the latter. With the laryngeal mirror diagnosis is easily confirmed. Those varieties of pseudo-membranous laryngitis may also separately develop without affecting the pharyngeal cavity, the whole lesion occupying the larynx even to the trachea.



The appearance of the rubeolar eruption enables us to put a true value on the complications which remain when the latter have disappeared.

*Course.*—The modifications in the vocal mucosa during the onset of the eruption may disappear when the latter becomes generalized. At other times, on the contrary, each congestive attack is followed by laryngeal lesions, which must be treated by special means. The course of the affection depends on the nature of the complications, its form, and the intensity of the rubeolar epidemic.

*Prognosis* is usually benign, yet crico-arytenoid articular lesions, perilaryngeal abscesses, gangrene of the mucosa, and simple inflammatory or pseudo-membranous laryngo-stenosis, are so many complications liable to make prognosis grave, as they may cause death.

*Treatment* at the beginning may be directed simply to the measles, taking care to avoid prescribing energetic counter-irritants. It will be sufficient to place sponges or linen soaked in warm water in front of the neck. Sinapisms, or even warm poultices, have a similar effect. If the larynx is affected during the course of the rubeolar eruption, warm inhalations will usually arrest aggravation of the symptoms.

If suffocation or graver complications are threatened, they should be treated by the usual means, remembering that rubeolar croup without alteration of the mucosa can be easily arrested by intubation of the larynx, which may equally be indicated in cases of immobility of the vocal cords in the mesial position through recurrent compression.

If ulceration or œdematous infiltration—in a word, hyper-acute inflammatory lesions—be present in the vocal mucosa, rest of the larynx may be assured more efficiently by tracheotomy, and a cure be facilitated in this way.

Treatment should then be directed to the different morbid alterations as seen on laryngoscopic examination.

#### TYPHOID LARYNGITIS.

Typhoid laryngitis comprises complications capable of affecting the vocal mucosa during typhoid or typhus fever.

*Frequency.*—The laryngeal complications of enteric fever were little known before the beginning of last century (Bayle, 1808; Brouillaud and Cruveilhier, 1825). The most important works on the question have been those of Koch (1878), N. Blaising (1880), Tissier, etc.

Authors who have written on this subject admit, that the frequency of those morbid alterations depends on the time and season when epidemics develop, and especially on the nature of the latter. Thus Mollière observed (1876) numerous laryngeal complications at Lyons, while at the same time those manifestations were rare in Paris, where the same disease raged.

Typhoid laryngitis is a common occurrence among soldiers on campaign, and affects debilitated subjects. It is better known in hospital than in private practice. The author is convinced that superficial laryngeal lesions would be fairly frequently observed if systematic examination of the pharyngeal cavity and the larynx typhoid patients were practised.

On the other hand, we know that many alterations of the larynx apparent during life are not observed on autopsy (*e.g.*, œdematous infiltrations, superficial erosions). The statistics dealing with the frequency of this complication are all more or less unreliable.

The slight erythematous forms are observed in the second, and especially in the third week, while the graver complications are met with principally during convalescence.

*Etiology—Pathogeny.*—The explanation of the appearance of this laryngitis may lie in the nature of the epidemic germ, the want of hygienic care, cold, and in the straining of the voice prior to the attack. Males seem to be more predisposed, probably on account of the nature of their ordinary vocations.

The most conflicting theories exist on the pathogenesis of these laryngeal lesions. According to Brouillaud and Cruveilhier, it is merely a question of inflammation analogous to that of the gums, tongue, and pharyngeal cavity.

Rokitansky admits a typhoid infiltration in the substance

of the tissues. 'Typhoid of the larynx,' says this author, 'is in some way the termination of abdominal typhus.' The position of the lesions is against the dorsal decubitus hypothesis. The non-existence of closed follicles, and even the rarity of ulceration in those portions of the vocal mucous membrane where they are agglomerated (ventricles, vocal cords), are sufficient to oppose the analogy said to exist between the larynx and the intestine (Wisseman, Coyne).

The microbic theory also has its supporters, and perhaps it may be admitted, that the larynx does not escape infection any more than the other organs.

*Symptomatology.*—Laryngeal manifestations of typhoid fever appear in different forms: (1) erythematous; (2) diphtheritic; (3) ulcerative, which is divided into primary necrosis and secondary or consecutive necrosis; (4) myopathic.

1. *Erythematous Form.*—Functional disturbances of simple acute catarrhal laryngitis are observed. A feeling of smarting and dryness in the pharyngeal cavity provokes difficulty and pain in swallowing. The voice is husky or raucous, coughing is absent, or if it exists is dry, paroxysmal, or spasmodic.

On laryngoscopic examination, general desquamation of the laryngeal mucosa is observed, mainly on the epiglottis, the aryepiglottic folds, the ventricular bands, and also on the vocal cords, specially on their upper surface.

The whole superficial layer of the epithelium is destroyed. Small blackish or dark grey mucous pellets are displaced during the effort of coughing, and are thus distinguished from erosions or even ulceration. The larynx appears dry and has a varnished-like appearance, resembling the mucosa of the nasal fossæ and the pharynx at this stage of the disease.

Erythematous laryngitis usually supervenes during the course of typhoid fever; it corresponds to the catarrhal form of German authors, and according to Lœri may occur with hypertrophy of the spleen, and with the characteristic temperature chart associated with this infection. This complication is observed specially in adults, and in really confirmed forms of enteric fever. It is exceptional in children.

2. *Diphtheritic Form*.—This is rare. It usually appears in the third week, and is characterized especially by the thinness of the false membrane, which covers the vocal mucosa.

The functional symptoms resemble those of diphtheria in general; nevertheless, as the membrane is not much developed, dyspnœa is usually slightly pronounced. True ulceration of the mucous membrane has been noted, as occurring in consequence of, or during the development of, pseudo-membranous laryngitis.

Eppinger is of the opinion that these membranous layers are not exudatory products, but are formed of an epithelium metamorphosed by necrosis, with here and there masses of micrococci. The latter, according to this author, play an active part in the production of the ulcerative process. Through the successive necrosis of the different layers loss of substance takes place, which Eppinger calls 'septic ulceration.' The latter may also appear along with typhoid ulceration.

3. *Ulcerative Form*.—Functional disturbances depend on the nature and extent of this complication. Sometimes palpation at the level of the larynx is painful, while in other cases no pain exists.

The modification of the voice varies according to the position and extent of the ulceration. If this attacks the posterior part of the larynx or the lateral portions (ventricular bands, cords, subglottic region, etc.), huskiness, raucous hoarseness, and even complete aphonia, are observed.

Respiratory disturbances may be slight or wanting. Dyspnœa may be considerable, and accompanied with attacks of suffocation, if rapid œdema of the aryepiglottic folds suddenly obstructs the entrance of the air tract. At other times tumefaction or abscesses of the arytenoid region produce respiratory stenosis, either by infiltration or by immobility of the cords through crico-arytenoid arthritis.

The character of the cough changes with that of the voice. Expectoration is variable, according to the extent and depth of the ulceration, usually mucous, and sometimes not very abundant. It is often purulent, streaked with blood, even

sanguinolent, and contains débris of necrosed cartilages or sphacelated mucosa. In this case the breath is fetid, and even ulcerating crypts may actually be seen.

At the beginning laryngoscopic examination reveals simple erosions on the epiglottis or posterior region. They are rounded, oval, or longitudinal, irregular, with flaccid, fringed, thick, and infiltrated edges. Soon afterwards those small ulcerations extend and form true craters, greyish, dull, with anfractuons and sharply-defined edges. The base of the ulcer is almost always covered with whitish grey detritus, presenting blackish spots at some points, which are indicative of necrosis of the subjacent cartilage.

Œdema of the neighbouring parts is always considerable. It occupies, as a rule, the aryepiglottic folds, particularly the region which corresponds to the crico-arytenoid articulation, the ventricular bands, or even the epiglottis and the subglottic region. Abscesses in the substance of the vocal mucosa are sometimes observed. They are deep and anfractuons, and at their base the cricoid, thyroid, and other cartilages are more or less altered by caries or necrosis.

The parts of the laryngeal framework affected by necrosis are, in order of frequency, the cricoid, the arytenoid, and lastly the thyroid and the epiglottis.

The profound alterations, of which laryngeal stenosis is the result, usually appear during convalescence. In grave cases external palpation reveals the existence of a thickening of the framework of the larynx, with small bosses indicating the modifications undergone by its fibro-cartilage (perichondritis).

External fistulæ communicating with an inflamed or necrosed cartilage may even be produced.

4. *Myopathic Form.*—This is usually manifested during convalescence from typhoid fever, or even after recovery. It consists of muscular disturbances, or even of definite paralysis, through atrophy or degeneration of one or more groups of the laryngeal muscles. These tropho-neurotic lesions only affect isolated muscles or those on one side. It is rare to see the disturbances extend simultaneously to the whole larynx. Nevertheless, the author has observed the



case of a young man who, as a result of typhoid, was seized with paralysis that seemed to attack all the laryngeal muscles. The cords appeared flexible and relaxed in the cadaveric position, yet an alarming laryngo-stenosis existed, which necessitated tracheotomy.

The functional disturbances of this complication vary according to the muscles paralyzed. If the thyro-arytenoidei or the constrictors are affected, the timbre of the voice is deeply changed, but in the case of the posterior crico-arytenoidei, respiration will be interfered with, and the timbre of the voice only slightly altered.

*Course, Duration, Progress.*—The course of typhoid laryngitis and its duration vary according to its nature and gravity. The erythematous form ordinarily disappears with the general malady causing it.

The diphtheritic form develops in a different way, according to the intensity of the exudative process and the type of the typhoid fever with which it is associated.

The course of the ulcerative laryngitis cannot be determined. It depends on the nature of the general infection of the patient, and on its extent, whether superficial or deep.

Cario-necrotic laryngitis is almost always accompanied by œdema and phlegmon, sometimes by gangrene. When recovery takes place, laryngeal stenosis follows from crico-arytenoid ankylosis, perichondritis, or diffuse infiltration of the larynx.

The myopathic form is generally of long duration. It is months before the paralyzed muscles resume their functions, and they may remain weak for a long time.

*Diagnosis* is sometimes easy, but in many cases it is almost impossible on account of the swelling of the affected parts. When vocal disturbances, dysphagia, or certain respiratory difficulties are observed during typhoid fever, attention should be directed to the larynx. Direct examination should then be practised to obtain a complete diagnosis of the case. This is usually easily performed, as the mucous membrane of the pharynx is less sensitive than usual.

*Prognosis* is very variable, being wholly subordinate to the

gravity of the infection producing the laryngeal complication, and to the nature even of the latter.

*Treatment* presents serious difficulties. At first it should be prophylactic. Sudden chills should be avoided, and huskiness and other vocal disturbances watched with care. As the treatment by cold baths is so much in vogue, it is necessary to ascertain if the patient suffers from a laryngeal affection, before undertaking it.

In slight catarrh, emollient and antiseptic inhalations may be prescribed, such as mentholated solutions in a little water.

R	Essence of Gaultheria	...	15 drops	℥ 15
	Pulverized menthol	...	2 to 3 grammes	gr. 30 to 45
	Thymol	...	1 gramme	gr. 15
	Balsam of Peru	...	10 grammes	ʒiiss
	Tincture of eucalyptus	...	150 „	ʒv

A teaspoonful in 1 pint of more or less warm water.

Those inhalations are beneficial. Alkaline mentholated gargles may also be used in superficial forms.

If intralaryngeal ulceration is present, sprays of carbolic acid, benzoate, borate or salicylate of soda, chloral hydrate, or bromide of potassium, may be useful. The following is specially recommended :

R	Benzoate of soda	}	...	āā 6 grammes	āā gr. 90
	Salicylate of soda				
	Chloral hydrate	...	3	„	gr. 45
	Glycerine	}	...	āā 50	„
	Peppermint water				
	Water	...	...	400	„

Aceto-tartrate of aluminium is an excellent substitute for benzoate of soda, using half the quantity. The same drugs may be used in the form of washes or gargles if the typhoid patient cannot use sprays.

In cases of abscess, intervention through the natural passages is preferable, if possible.

Tracheotomy on the trachea itself, and not in the crico-

thyroid space, is the sole treatment in cases of œdematous infiltration, with or without ulceration. Koch has already insisted in his work on typhoid laryngitis on the necessity of opening the air tract below the cricoid, because the latter and the first ring of the trachea are often affected with necrosis. The operation should be slowly performed, layer by layer, and the trachea incised carefully, so as to avoid misadventure. The canula should be removed when the larynx has resumed its normal shape and the patient is better. If laryngeal stenosis exists, treatment should be carried out as indicated above.

### SCARLATINAL LARYNGITIS.

Secondary diphtheria is the laryngeal complication of this eruptive fever. Certain epidemics of scarlatina—and, in fact, of all eruptive fevers—are more fatal than usual, and present in their course laryngo-tracheal complications. Although false membranes are found post-mortem in subjects who have succumbed to scarlatina with concomitant laryngitis, it does not follow that there was true diphtheria of the larynx. There have been observed on the larynx ulceration and necrosis of the cartilages, with perichondritis and all the symptoms accompanying these lesions. The pseudo-membranous exudation is here secondary. It is found in most of the ulcerative inflammatory affections of the pharyngeal cavity and the larynx. In a general way scarlatina occurs as an inflammatory laryngitis, with infiltration of the glottic and subglottic mucosa, accompanied by pseudo-membranous exudation, extending to the trachea and even to the bronchi, sometimes in a true ulcerative form. This variety of laryngitis is characterized, not only by œdematous infiltration of all the parts of the pharynx, but specially by more or less deep ulceration, sometimes reaching the cartilage. The latter is attacked by perichondritis, and is sometimes even necrosed.

Local treatment varies from simple inhalations, warm fomentations, injections of serum, etc., to intubation and tracheotomy.

## SMALL-POX (VARIOLA).

Laryngeal complications of small-pox appear at two different stages of the disease. In the first period they consist of more or less abundant though discrete pustules of the laryngeal mucosa, while at a later stage the more profound alterations consist of œdematous infiltration and ulceration. The larynx, in contradistinction to that observed in measles, frequently remains intact during the prodromal stage of the disease, it being usually affected between the third and sixth day, when the cutaneous eruption appears. Variola of the larynx is very frequent. It exists in all fatal cases of small-pox (Rühle and Eppinger).

*Pathological Anatomy.*—Authors who have practised laryngoscopy of variolous subjects have for long debated, whether the lesions seen directly with the mirror were true small-pox pustules or pseudo-pustules. It is manifest, that the eruption cannot show in the larynx all the characteristics of cutaneous lesions. The incessant motion of this organ and its moist condition rapidly bring about the rupture of the pustule.

Desquamation of the cylindrical epithelial cells is produced by the suppuration. An extensive serous infiltration may also occur on the aryepiglottic folds and the subglottic mucosa.

A little later on true ulceration is met with in some cases. It is discrete in other cases, or the edges of the ulcers may meet, so as to give the laryngeal mucosa a crater-like appearance.

Hæmorrhage is sometimes observed in the pustules, or in the submucous tissue (hæmorrhagic form).

At a more advanced stage, the ulceration—at first superficial—reaches the perichondrium and incites inflammation there. This perichondritis (Eppinger) follows either septic abscesses on the surface or a diffuse inflammation of the submucous tissue, almost resembling the primary form.

Large gangrenous abscesses then appear, accompanied by necrosis of the cartilages, which are partially or totally eliminated. Ankylosis, cicatricial stenosis, etc., result, even when the patient is cured of the foregoing acute complications.

*Symptoms* vary according to the site and nature of the lesion. In cases of epiglottic or arytenoid pustular eruptions the principal symptom is a more or less acute pain on deglutition. This pain is also very pronounced in cases of perichondritis or extensive ulceration. External palpation is painful, if the morbid changes have invaded the thyroid perichondrium. Vocal disturbances are the more pronounced as the lesions are deeper (vocal cords, etc.). They vary with the nature, form, and the extent of the local manifestation.

The case of respiration is strictly proportionate to the degree of patency of the glottic orifice. If there exists inflammatory swelling or serous effusion sufficient to block the orifice of the air tract, fits of suffocation may supervene. This symptom is seen in a very marked form in necrosis of the cricoid, in consequence of the collapse of the laryngeal framework, or at least the partial or total immobility of the crico-arytenoid articulation.

Paresis or even paralysis, occurring in certain cases, is the result (Rühle) of the invasion of the muscles by the oedematous process.

The author thinks, that the causes of immobility of the vocal cords are more complex, for muscular disturbances may result from peripheral neuritis or crico-arytenoid arthritis.

There is met with on laryngoscopic examination a slight redness of the mucosa, which at the outset appears somewhat swollen and covered with more or less thick mucus. During the eruptive stage pustules may be noticed under the epithelial layer, but most frequently the surface of the mucosa is irregular and ulcerated in places.

Later on true ulceration, with small hæmorrhages in the submucosa, is perceived, whose extent and locality may be determined by the mirror.

*Course, Duration, and Termination.*—The course varies according as we are dealing with pustules, abscess, ulceration, or necrosis.

The pustules may be very discrete, suppurate moderately, then cicatrize rapidly, leaving only a small depression.



On the contrary, if laryngeal complication (œdema, abscess, ulceration, perichondritis, etc.) supervenes during convalescence, it outlasts the variola and terminates in a different way, according to the intensity of the local infectious process and its diffusion.

The course of the disease may be extraordinarily variable—depending on the virulence of the epidemic, the infection, and the soil on which it has developed.

*Diagnosis* is easy, from the existence of the general eruptive malady. Its location and extent are determined by laryngoscopic examination.

*Prognosis* is usually grave, for the existence of laryngeal complications in variola always indicates a grave infection, capable of spreading to the deep respiratory organs. Ecchymoses of the laryngeal mucosa are also serious. They occur in hæmorrhagic variola, which in itself is very grave.

Death may occur abruptly from the very abundant and rapid serous effusion of the aryepiglottic folds (Trousseau).

*Prognosis* is based on the general condition of the patient, the prevalent epidemic, and the laryngoscopic appearances. Great reserve must be shown, even in slight forms, as to the possible termination.

*Treatment.*—In benign cases expectant treatment is sufficient. The employment of warm inhalations, to favour the evacuation of pus outwards, is recommended.

If deep abscesses exist, they should be treated like ordinary purulent collections in the larynx. Should the œdema be considerable and grave, local sprays of adrenalin and cocaine, or, better still, scarification or incision of the infiltrated mucosa, may be carried out. Tracheotomy is performed in preference to intubation, as the latter gives bad results, as soon as suffocative symptoms appear, and should be low enough to avoid the cricoid ring, for the first ring is often affected. Here, more than ever, the tissues situate in front of the trachea should be incised slowly, and the position where the opening is to be made clearly defined, to enable the canula to be placed in the midst of healthy cartilages.

## ERYSIPELATOUS LARYNGITIS.

That erysipelas affects the mucosa of the air tract has been long known.

*Etiology and Pathogeny.*—While the etiology of laryngeal erysipelas is still obscure, its pathology is more explicable. There is no reason why the larynx should escape the usual causes of septic inoculation. The mucosa, however, being less exposed than the external integument, is on that account less frequently attacked. Erysipelas is due to infection, the streptococcus penetrating from the periphery downwards (secondary), or *vice versâ* (primary).

*Symptoms.*—Symptoms vary according to the intensity of the affection. Three forms are recognized: (1) erythematous; (2) phlyctenular; (3) gangrenous.

1. *Erythematous Form.*—Functional symptoms consist in slight pain on deglutition, a burning sensation in the pharyngeal cavity, with more or less huskiness.

Examination of the larynx reveals diffuse redness, with variable swelling of the epiglottis, or its folds, and sometimes of the cords and the ventricular bands.

2. *Phlyctenular Form.*—The functional symptoms of this form, slightly more marked than in the preceding, are those of œdematous laryngitis. The respiratory disturbances often necessitate rapid and energetic intervention.

On laryngoscopic examination, swelling is seen, resembling acute œdema of the aryepiglottic folds. Massei is of the opinion that this is a primary erysipelas of the larynx. Frequently at the level of the affected parts small superficial phlyctenulæ may be present; which sometimes pass unperceived. In this form the swelling not only attacks the epiglottis and its folds, but the whole vocal mucosa, often the subglottic region and the trachea, a fact which explains the dyspnœic disturbances observable in patients affected with this variety of diffuse infection.

3. *Gangrenous Form.*—The symptoms resemble those of submucous laryngitis, or primary infectious phlegmon of the larynx (Senator). It is characterized, not only by a profound

alteration of the mucosa, but also of the cartilages of the larynx.

The general symptoms are usually characterized by violent shivering, with fever ( $39^{\circ}$  to  $41^{\circ}$  C.), great depression, malaise, vomiting, etc. Soon afterwards burning sensations appear in the pharyngeal cavity, then pain on deglutition, huskiness, laboured and stertorous breathing, and the whole features of a characteristic serious lesion of the vocal mucosa. It must be remembered, however, that glandular involvement

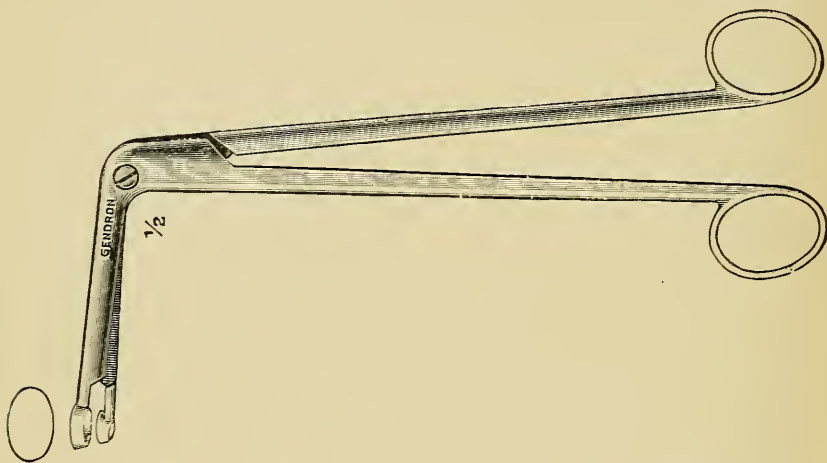


FIG. 210.—GOUGUENHEIM'S ANTERO-POSTERIOR CUTTING FORCEPS.

The Author's pattern is furnished with lateral movement.

is usually absent if the larynx alone is affected and the pharyngeal cavity free.

Adenitis, if present, will appear in the glands situate in front of the larynx.

*Course, Duration, and Termination.*—The appearance of the disease is usually rapid, although it may occur by onsets, as in erysipelas in general. Its course is progressive, so that in a few hours the disturbances may attain to a remarkable intensity. The duration depends on the nature of the infectious process. The erythematous form has a short duration, while the phlyctenular and the gangrenous last for several days, and end either in an abscess or a diffuse

phlegmon, with elimination of the necrosed cartilages or the fragments of sphacelated mucosa, or by asphyxia and rapid death, through suffocation or cachexia, or finally by abatement and cure, with or without consecutive laryngo-stenosis.

*Prognosis* is always grave. It depends on the extent, rapidity, and specially on the form, of the laryngeal erysipelas.

*Diagnosis* is usually easy. The intensity of the general and functional symptoms and the redness of the affected parts, extending as a rule to the pharynx, with diffuse tumefaction, admit of primary erysipelas being distinguished from simple primary acute œdema of the larynx. Secondary erysipelas, coming through propagation of cutaneous lesions, can hardly be confused with another affection of the larynx.

Acute œdema, terminating in a phlegmon, or the existence of an abscess or gangrenous phlegmon of the larynx, always suggests erysipelas rather than a simple œdema, the course of the latter being generally ephemeral.

*Treatment* consists in the administration of purgatives, preferably saline. Injections of antistreptococcic or of physiological serum help to maintain and restore strength, and to facilitate expectoration. Locally, hot fomentations applied to the neck, sedative inhalations, carbolic sprays or gargles or other antiseptics, or, better still, with oxygenated water (1 : 12), should be employed. Finally, tracheotomy may be necessary. It must, however, be confessed that those therapeutic means are frequently unsuccessful.

If acute œdematous infiltration or pus appears, it may be treated as an œdematous laryngitis.

### **Rheumatic Arthritis of the Larynx.**

Rheumatic laryngeal affections, although not rare, are still but little known. They often pass unperceived, or the lesions observed are assigned to other causes. Isolated cases of crico-arytenoid arthritis due to rheumatism have been recorded (Deshousses, 1860; Lacoarret, 1891).

Rheumatic arthritis appears simultaneously with an attack

of articular rheumatism, or follows it, thus suggesting the diagnosis of the laryngeal affection. The author has even seen it exist primarily with the symptoms of a simple acute inflammation due to cold.

1. **Crico-arytenoid Arthritis.**—The chief symptom is pain, frequently spontaneous, intensified by the passage of food, and even on phonation causing phonophobia. Pressure at the level of the affected articulation (crico-arytenoid or crico-thyroid) is extremely painful. The side of the neck may be swollen, and some authors (Grünwald, Newcomb) have recorded a sort of crepitation perceptible to the hand when placed on the neck of the patient, particularly during deglutition.

Respiration is generally free when the arthritis is not bilateral, and the two vocal cords not immobilized in the middle line.

Laryngoscopic examination usually reveals redness of the arytenoid region, reaching slightly towards the corresponding epiglottic fold. This region is infiltrated, especially towards the base of the arytenoid, and to the inside of the larynx, so to speak, on the side of the vocal apophysis. (The opposite occurs in influenzal arthritis.) The corresponding cord is, of course, immobilized in the middle line, or only very slightly mobile.

The lesion, if bilateral, may be more pronounced on one side than on the other.

The general symptoms correspond to the degree of the infection producing the laryngeal lesion.

Diagnosis is easy, if unilateral arthritis coexists with evidences of muscular or articular rheumatism in other parts of the body, or if the patient is undoubtedly rheumatic.

In arthritis *a frigore* the infiltration is serous and diffuse, invading the aryepiglottic folds and the epiglottis, rather than the arytenoid region alone. In influenza the lesion is almost always bilateral, the infiltration affecting the œsophagus more than the arytenoid. The pain recurs periodically in the evening and during the night, diminishing, and even disappearing, in the morning and during the day.



2. **Crico - thyroid Arthritis.** — The crico-thyroid articulations may be affected separately (Escat), and in that case aphonia from immobility of the affected region is the chief functional disturbance.

Palpation is painful at the level of the inferior horns of the thyroid. Pain is also produced by faradic excitation of the crico-thyroid muscle (Escat).

Laryngoscopic examination reveals a more or less marked relaxation of the paresed cord.

The author has seen these two forms of arthritis co-exist in the same subject during an attack of articular rheumatism, which successively invaded most of the large articulations.

The course of the disease specially depends on the general infection. Health is usually restored in a few weeks.

Escat admits, however, that the lesion may become chronic, and produce through ankylosis a deformity, which he proposes to call 'nodular laryngeal rheumatism.'

General treatment should consist in saline purgatives, hot drinks, salicylate of soda—4 to 6 grammes in the twenty-four hours, according to the age of the patient and the degree of infection.

Locally, rest of the organ should be prescribed, the application of counter-irritants, such as sinapisms, methyl chloride (almost to the extent of producing vesication), methyl salicylate, or tincture of iodine, over which cotton-wool is applied.

Warm aromatic inhalations (30 grammes to 1 litre of water), used thrice daily for about five minutes, are also excellent sedatives.

Rest in bed or at least confinement to the room is indicated. If the affection is bilateral, and respiratory disturbances exist (noisy inspiration and expiration), intubation or tracheotomy should be performed.

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